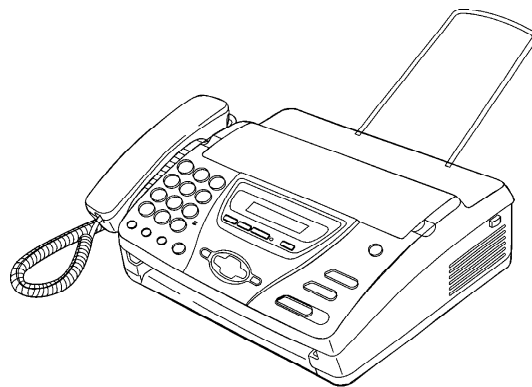


ORDER NO. KMF0205573C3

Personal Facsimile with Telephone Answering System

KX-FT78BR-G
(for Brazil)



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Panasonic

1. INTRODUCTION

1.1. LCD MESSAGE

English	Portuguese															
CALL SERVICE 1	C	H	A	M	A	R		T	E	C	N	I	C	O	1	
CALL SERVICE2	C	H	A	M	A	R		T	E	C	N	I	C	O	2	
CHECK COVER			F	E	C	H	A	R		T	A	M	P	A		
CHECK DOCUMENT	V	E	R	I	F	I	Q	U	E		D	O	C	.		
CHECK MEMORY	V	E	R	I	F	I	Q	U	E		M	E	N	.		
DIAL LOCK	B	L	O	Q	U	E	I	O		D	I	S	C	.		
DIRECTORY	D	I	R	E	T	Ó	R	I	O							
DIRECTORY FULL	D	I	R	E	T	Ó	R	I	O		C	H	E	I	O	
FAX IN MEMORY	D	O	C	.		N	A		M	E	M	Ó	R	I	A	
MEMORY FULL	M	E	M	Ó	R	I	A		C	H	E	I	A			
NO RESPONSE	N	Ã	O		R	E	S	P	O	N	D	E				
NO TAD GREETING	S	E	M		M	E	N	S	.	S	E	C	.			
NO TRNS-GREET.	S	E	M		M	E	N	S	.	T	R	A	N	S	F	
OUT OF PAPER			A	C	A	B	O	U		P	A	P	E	L		
PAPER JAMMED	P	A	P	E	L		E	N	R	O	S	C	A	D	O	
POLLING ERROR	E	R	R	O		P	O	L	L	I	N	G				
PRESS [<>]&[SET]	P	R	E	S	S	.	<<	>>	&	G	R	A	V	.		
RECEIVE MODE	R	E	C	E	P	Ç	Ã	O								
REDIAL TIME OUT	F	I	M	/	R	E	D	I	S	C	A	G	E	M		
REMOVE DOCUMENT	R	E	M	O	V	A		A		F	O	L	H	A		
SYSTEM SET UP	P	R	O	G	R	A	M	A	Ç	Ã	O					
TAD OPERATION	O	P	E	R	A	Ç	Ã	O		S	E	C	.			
TRANSMIT ERROR	E	R	R	O		D	E		T	R	A	N	S	M	.	
UNIT OVERHEATED	S	U	P	E	R	A	Q	U	E	C	I	D	O			
USER STOPPED			I	N	T	E	R	R	U	P	Ç	Ã	O			
YOUR LOGO	S	E	U		L	O	G	O	T	I	P	O				

1.2. ERROR CODE TABLE

ENGLISH	PORTUGUESE
COMMUNICATION ERROR	ERRO DE COMUNICAÇÃO
DOCUMENT JAMMED	DOCUMENT ENROSCADO
ERROR-NOT YOUR UNIT	ERRO DA OUTRA MÁQUINA
MEMORY FULL	MEMÓRIA CHEIA
NO DOCUMENT	COLOQUE DOCUMENTO
OTHER FAX NOT RESPOND	NÃO RESPONDE
PRESSED THE STOP KEY	DIGITE A TECLA PARAR
OK	OK

1.3. BUTTONCODE TABLE

ENGLISH	PORTUGUESE
BROADCAST	MULTITRANS.
COPY	CÓPIA
DIGITAL SP-PHONE	VIVA-VOZ DIGITAL
FAX / START	FAX / INÍCIO
FLASH	FLASH
HELP	AJUDA
MENU	FUNÇÕES
MONITOR	MONITOR
MUTE	EMUDECE
RECEIVE MODE	RECEPÇÃO
REDIAL / PAUSE	REDISCAR / PAUSA
STOP	PARAR
TONE	TOM

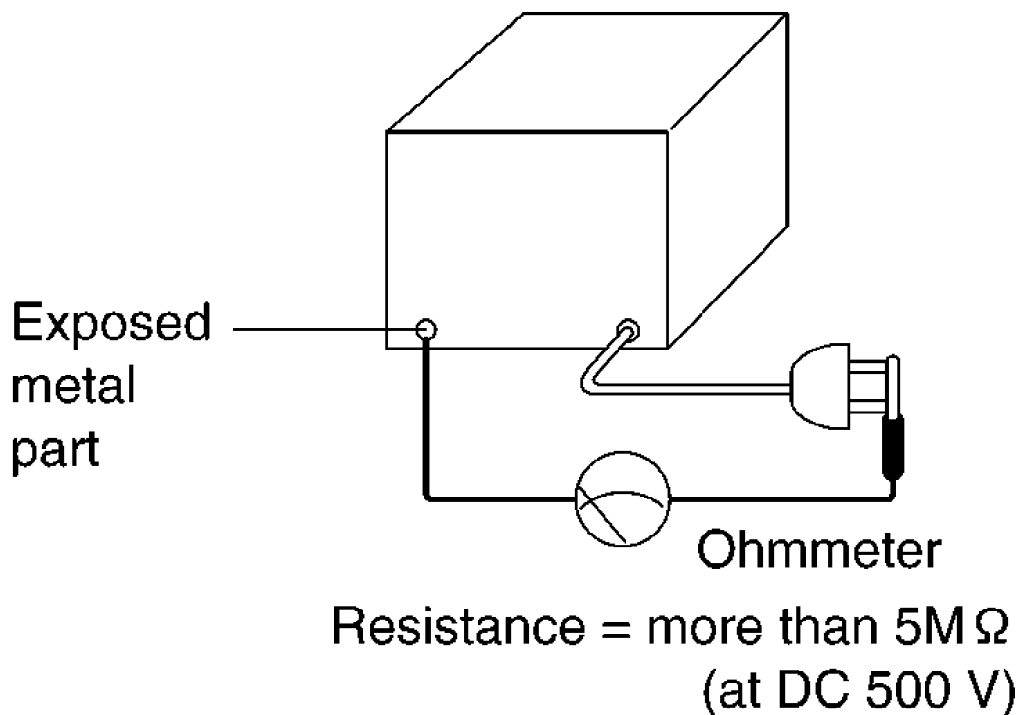
1.4. SAFETY PRECAUTIONS

1. Before servicing, unplug the AC power cord to prevent an electric shock.
2. When replacing parts, use only the manufacturer's recommended components.
3. Check the condition of the power cord. Replace if wear or damage is evident.
4. After servicing, be sure to restore the lead dress, insulation barriers, insulation papers, shields, etc.
5. Before returning the serviced equipment to the customer, be sure to perform the following insulation resistance test to prevent the customer from being exposed to shock hazards.

1.5. INSULATION RESISTANCE TEST

1. Unplug the power cord and short the two prongs of the plug with a jumper wire.

2. Turn on the power switch.
3. Measure the resistance value with an ohmmeter between the jumpered AC plug and each exposed metal cabinet part (screw heads, control shafts, bottom frame, etc.).
Note: Some exposed parts may be isolated from the chassis by design. These will read infinity.
4. If the measurement is outside the specified limits, there is a possibility of a shock hazard. / The equipment should be repaired and rechecked before it is returned to the customer.



1.6. FOR SERVICE TECHNICIANS

ICs and LSIs are vulnerable to static electricity. / When repairing, the following precautions will help prevent recurring malfunctions.

1. Cover the plastic part's boxes with aluminum foil.
2. Ground the soldering irons.
3. Use a conductive mat on the worktable.
4. Do not touch the IC or LSI pins with bare fingers.

1.7. BATTERY CAUTION

CAUTION

Danger of explosion if battery is incorrectly replaced.

Replace only with the same or equivalent type recommended by the manufacturer.

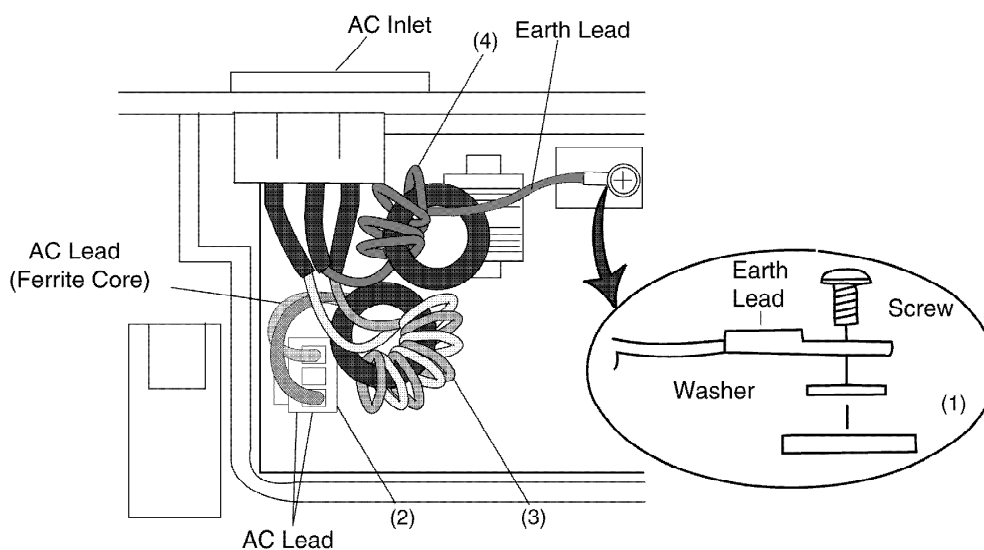
Dispose of used batteries according to the manufacture's Instructions.

The lithium battery is a critical component . (type No. CR2032). Please observe for the proper polarity and the exact location when replacing it and soldering the replacement lithium battery in.

1.8. AC CAUTION

For safety, before closing the lower cabinet, please make sure of the following precautions.

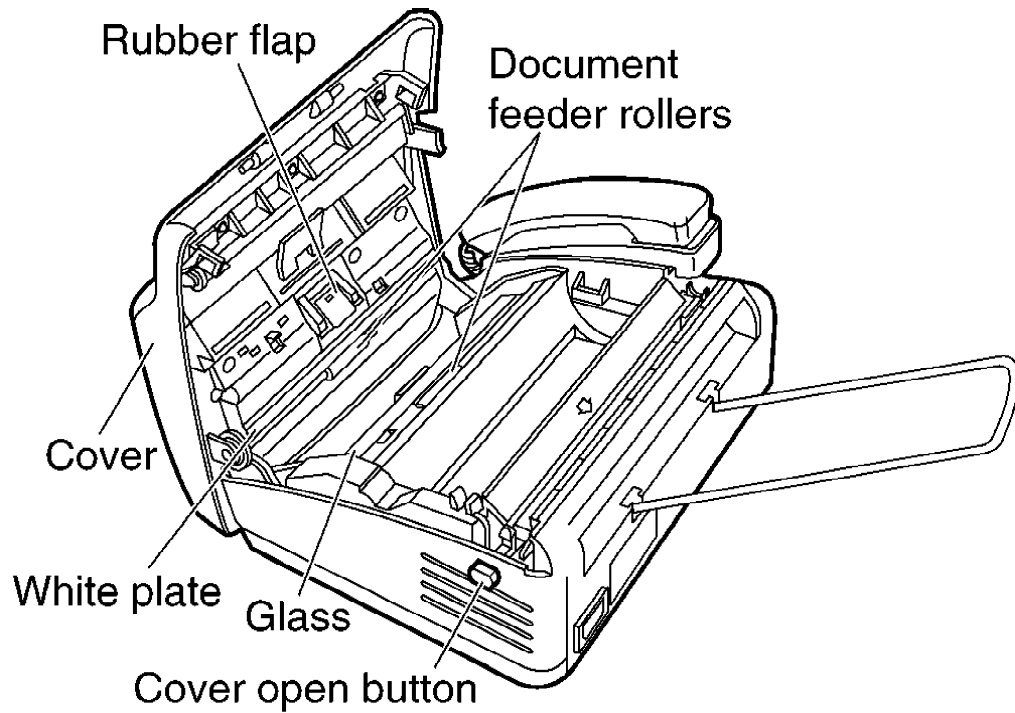
- (1) The earth lead is fixed with the screw.
- (2) The AC connector is connected properly.
- (3) Wrap the Earth lead around the core 4 times.
- (4) Wrap the AC lead around the core 4 times.



1.9. PERSONAL SAFETY PRECAUTIONS

1.9.1. MOVING SECTIONS OF THE UNIT

Be careful not to let your hair, clothes, fingers, accessories, etc., become caught in any moving sections of the unit. / The moving sections of the unit are the rollers and a gear. There is a separation roller and a document feed roller which are rotated by the document feed motor. A gear rotates the two rollers. Be careful not to touch them with your hands, especially when the unit is operating.



1.9.2. LIVE ELECTRICAL SECTIONS

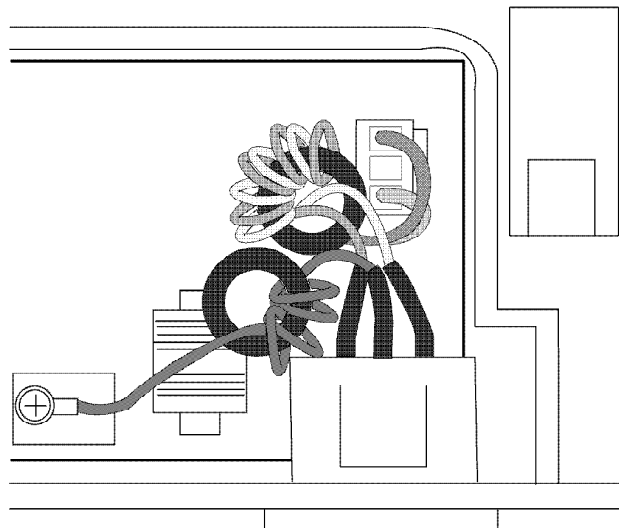
All the electrical sections of the unit supplied with AC power by the AC power cord are live. / Never disassemble the unit for service with the AC power supply plugged in.

(Bottom view)



AC voltage is supplied to the primary side of the power supply unit. Therefore, always unplug the AC power cord before disassembling for service.

Be careful of "High Voltage" in this area.



1.10. FEATURES

General

- Help function

Please refer to **WHEN YOU DON'T KNOW HOW TO OPERATE THE UNIT, USE THE HELP FUNCTION.**() to print below features.

Display: Refer to **LCD MESSAGE** ()

- DIRECTORY
- RECEIVE MODE
- TAD OPERATION

Facsimile

- Resolution: Standard/Fine/Super Fine/Halftone
- Copier Function
- Help Printout
- Automatic Document Feeder (10 Sheets)
- Easy-to-view LCD (15 Characters)
- Broadcast (up to 10 Stations)

Integrated telephone system

- Telephone Directory (50 Stations)
- Digital Duplex Speakerphone

Digital answering system

- Voice Time/Day Stamp
- Quick & Slow Playback Speeds

1.11. SPECIFICATIONS

Applicable Lines:

Public Switched Telephone Network

Document Size:

Max. 216 mm in width

Max. 600 mm in length

Effective Scanning Width:

208mm

Recording Paper Size:

216 mm max. 30 m roll

Effective Printing Width:

208 mm

Transmission Time*:

Approx. 15 s/page (Original mode)**

Scanning Density:

Horizontal:

8 pels/mm

Vertical:

3.85 lines/mm—STANDARD mode

7.7 lines/mm—FINE/HALF TONE mode

15.4 lines/mm—SUPER FINE mode

Halftone Level:

64-level

Scanner Type:

Contact Image Sensor (CIS)

Printer Type:

Thermal Printing

Data Compression System:

Modified Huffman (MH), Modified READ (MR)

Modem Speed:

9,600 / 7,200 / 4,800 / 2,400 bps; Automatic Fallback

Operating Environment:

5°C—35°C °, 45 %—85 % RH (Relative Humidity)

Dimensions (H×W×D):

117 mm × 347 mm × 270 mm

Mass (Weight):

Approx. 2.6 kg

Power Consumption:

Standby: Approx. 4.0 W

Transmission: Approx. 25 W

Reception: Approx. 30 W (When receiving the ITU-T No. 1 Test Chart)

Copy: Approx. 30 W (When copying the ITU-T No. 1 Test Chart)

Maximum: Approx. 125 W (When receiving a 100% black document)

Power Supply:

120 V AC, 60 Hz

Memory Capacity:

Approx. 20 minutes of recording time including the greeting message***

* Transmission speed depends upon the contents of the pages, resolution, telephone line conditions and capability of the other party's machine.

** The 15 second speed is based upon the ITU-T No. 1 Test Chart and original mode. (Refer to **ITU-T NO. 1 TEST CHART** ().)

If the capability of the other party's machine is inferior to your unit, the transmission time may be longer.

*** Recording time may be reduced by calling party's background noise.

Note:

- Any details given in these instructions are subject to change without notice.
- The pictures and illustrations in these instructions may vary slightly from the actual product.

1.12. OPTIONAL ACCESSORIES

Model No.	Description	Specifications
KX-A106	Standard thermal recording paper	216 mm x 30 m x roll, with 25 mm core

1.13. ITU-T NO. 1 TEST CHART



THE SLEREXE COMPANY LIMITED

SAPORS LANE - BOOLE - DORSET - BH 25 8 ER

TELEPHONE BOOLE (945 13) 51617 - TELEX 123456

Our Ref. 350/PJC/EAC

18th January, 1972.

Dr. P.N. Cundall,
Mining Surveys Ltd.,
Holroyd Road,
Reading,
Berks.

Dear Pete,

Permit me to introduce you to the facility of facsimile transmission.

In facsimile a photocell is caused to perform a raster scan over the subject copy. The variations of print density on the document cause the photocell to generate an analogous electrical video signal. This signal is used to modulate a carrier, which is transmitted to a remote destination over a radio or cable communications link.

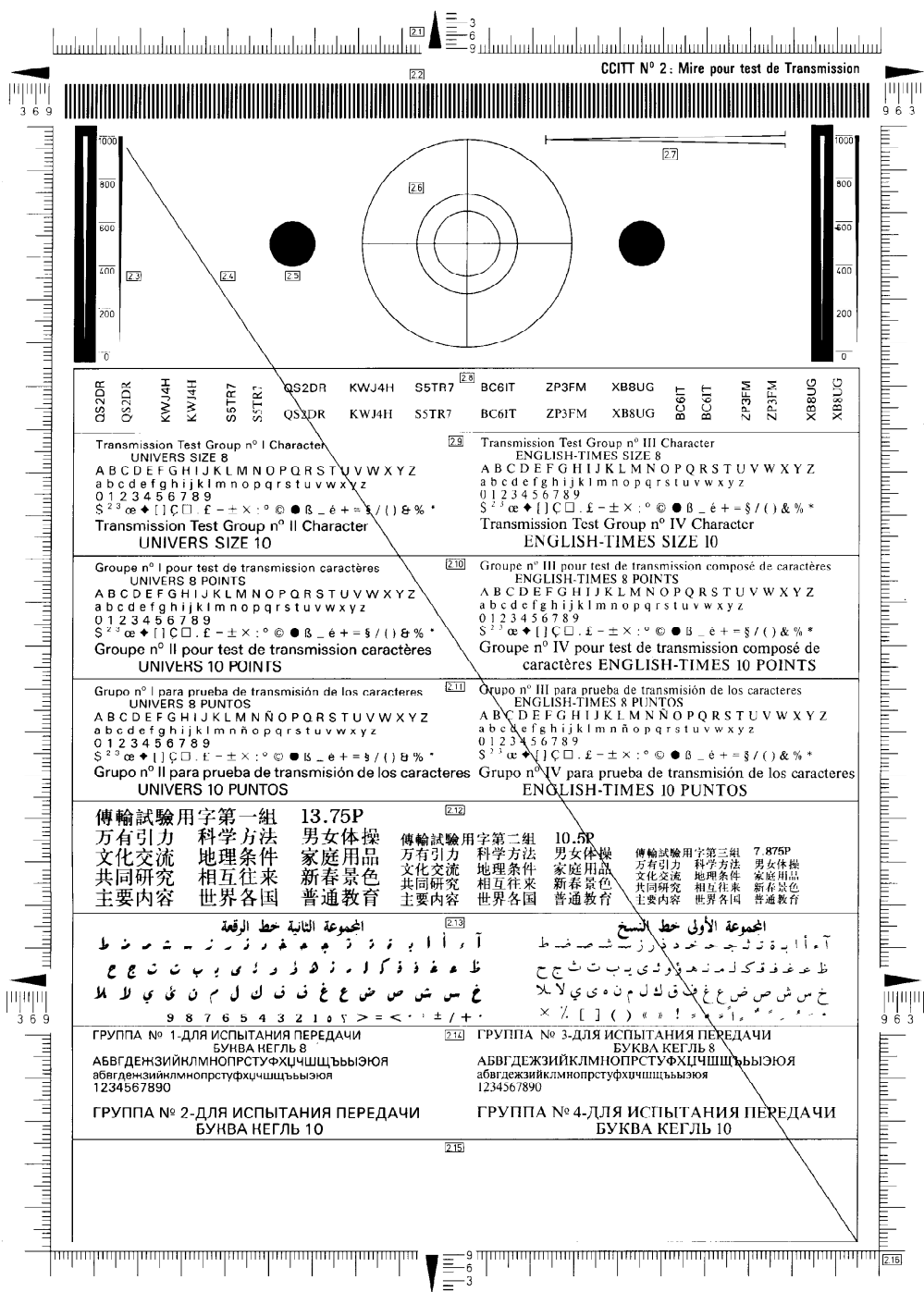
At the remote terminal, demodulation reconstructs the video signal, which is used to modulate the density of print produced by a printing device. This device is scanning in a raster scan synchronised with that at the transmitting terminal. As a result, a facsimile copy of the subject document is produced.

Probably you have uses for this facility in your organisation.

Yours sincerely,

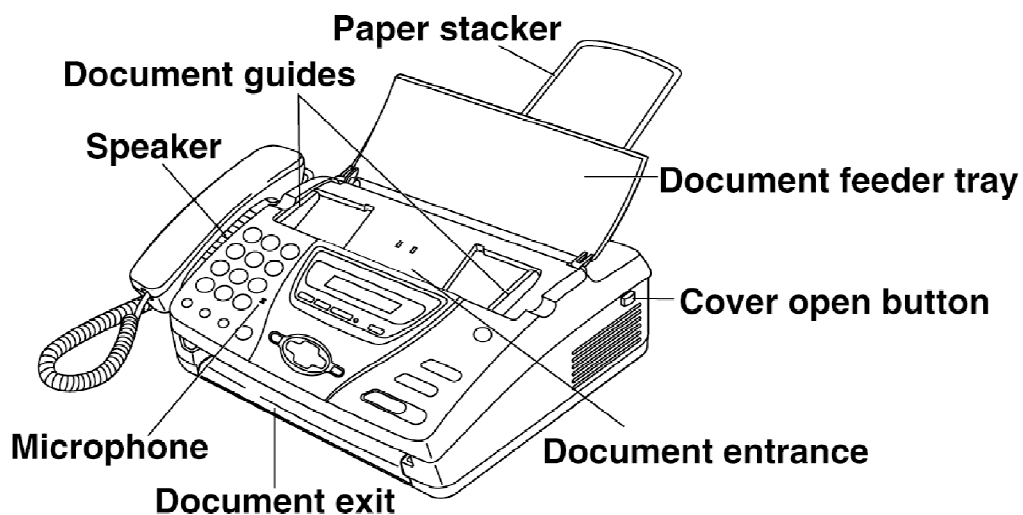
P.J. CROSS
Group Leader - Facsimile Research

1.13.1. CCITT NO. 2 TEST CHART

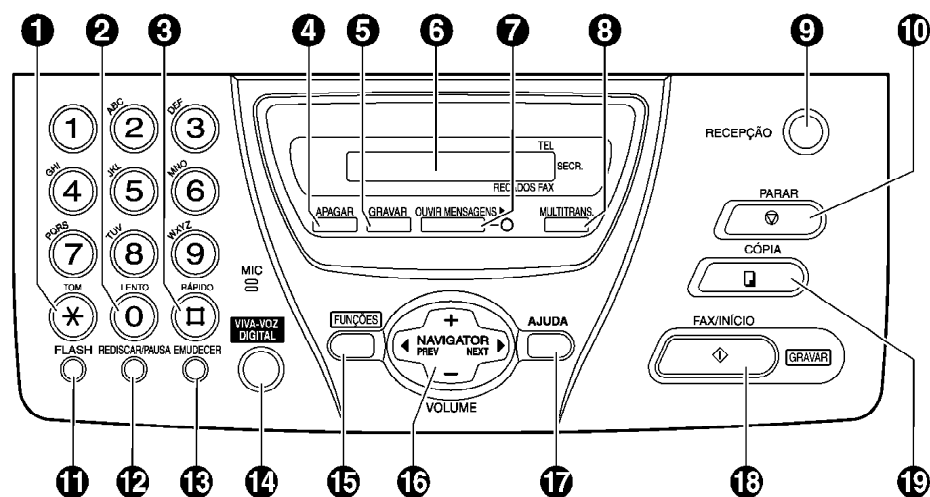


1.14. LOCATION OF CONTROLS

1.14.1. OVERVIEW



1.14.2. CONTROL PANEL



1 TONE

- To change from pulse to tone temporarily during dialling when your line has rotary pulse services .

2 SLOW

- For slow playback.

3 QUICK

- For quick playback.

4 ERASE

- To erase recorded messages.

5 RECORD

- To record your messages.

6 Display

7 PLAY MESSAGES

- To play recorded messages.

8 BROADCAST

- To transmit to multiple entries .

9 RECEIVE MODE

- To change the receive mode.

10 STOP

- To stop an operation or cancel programming.

11 FLASH

- To access special telephone services such as call waiting or for transferring extension calls.

12 REDIAL/PAUSE

- To redial the last number dialled. If the line is busy when you make a phone call using the

DIGITAL SP-PHONE

button, the unit will

automatically redial the number up to 5 times.

- To insert a pause during dialling.

13 MUTE

- To mute your voice to the other party during a conversation. Press this button again to resume the conversation.

14 DIGITAL SP-PHONE

- For speakerphone operation. To switch to the handset, lift the handset. To switch back to the speakerphone, press

DIGITAL SP-PHONE

15

MENU

- To initiate or exit programming.

16

NAVIGATOR, VOLUME

- To adjust volume.
- To search for a stored name.
- To select the features or feature settings during programming.
- To navigate to the next operation.

17

HELP

- To print a quick reference.

18

FAX/START,SET

- To initiate fax transmission or reception.
- To store a setting during programming.

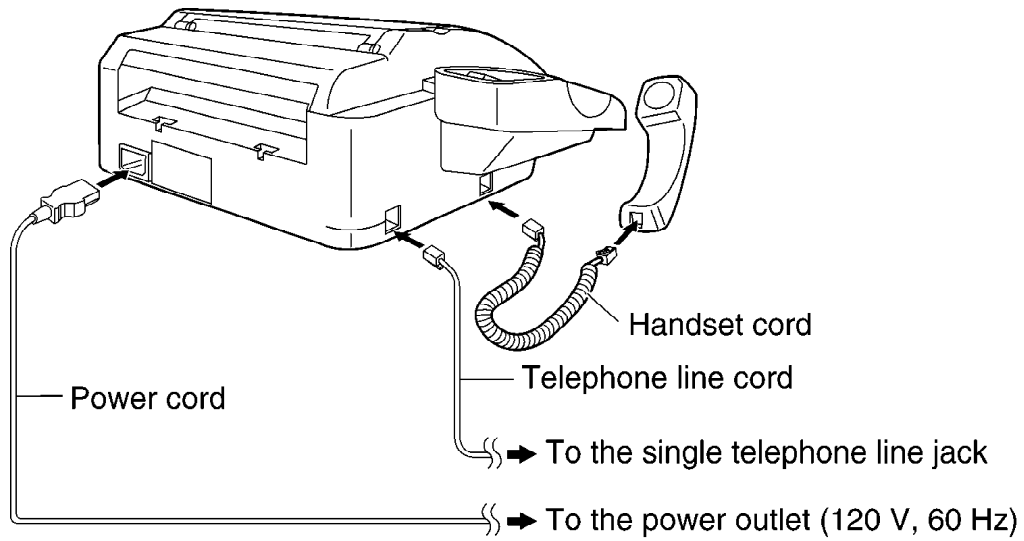
19

COPY

- To initiate copying.

1.15. CONNECTIONS

- (1) Connect the handset cord.
- (2) Connect the telephone line cord.
- (3) Connect the power cord.



NOTE

When you operate this products, the power outlet should be near the product and easily accessible.

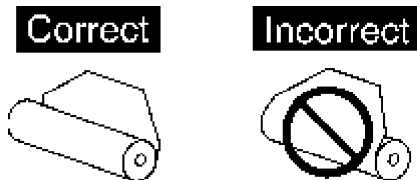
1.16. INSTALLATION

1.16.1. INSTALLING THE RECORDING PAPER

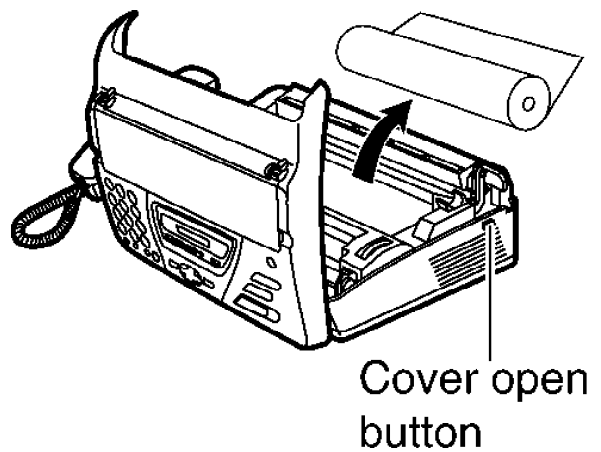
For replacement, remove the vused core after opening the cover.

Refer to **BUTTONCODE TABLE** ()

1 Open the cover by pressing the cover open button and install the recording paper roll.

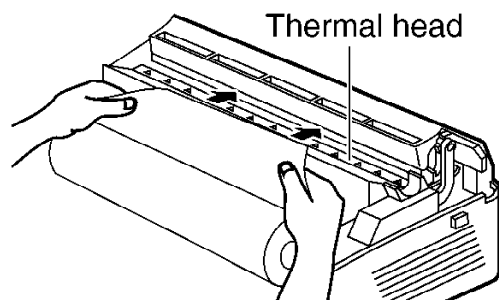


If the paper is secured with glue or tape, cut approximately 15 cm (6 inches) from the beginning.



2 Insert the leading edge of the paper into the opening above the thermal head and pull it out of the unit.

-Make sure that there is not slack in the paper roll.



3 Close the cover securely by pushing down on both sides.

Display:

PRESS START

4 Press

FAX/START

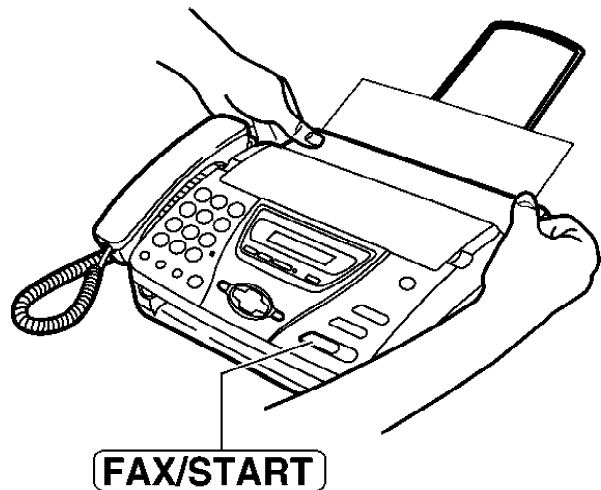
-The unit will eject the paper slightly and cut it.

-If you do not press

FAX/START

within

30 seconds after closing the cover, the unit will automatically eject the paper slightly and cut it.

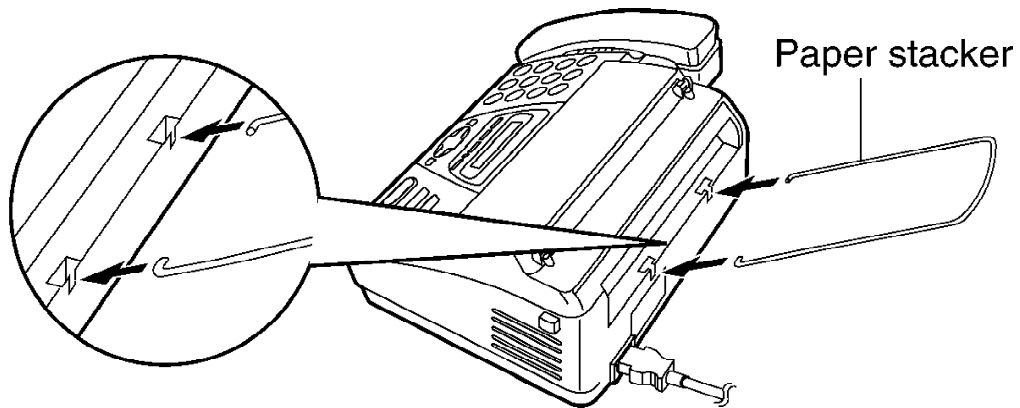


Note:

- Only use the included roll of paper or specified recording paper, or else the print quality may be affected and/or excessive thermal head wear may occur.
- To order recording paper, see **OPTIONAL ACCESSORIES** ().
- When the power cord is connected, every time you close the cover a message will be printed if the recording paper is set to the wrong side, a message will not be printed.
Install the paper correctly.

1.16.2. PAPER STACKER

Install the paper stacker.



1.16.3. SETTING YOUR LOGO

The logo can be your company, division or name.

1. Press **MENU** .

Display: Refer to **LCD MESSAGE ()** **BUTTONCODE TABLE ()**

SYSTEM SET UP

2. Press **SET** .

PRESS [◀ ▶] & [SET]

3. Press **◀** or **▶** until the following is displayed.

YOUR LOGO

4. Press **SET**

LOGO=

5. Enter your logo, up to 30 characters, using the dial keypad.

Example: Bill

- A. Press **2** 2 times.

LOGO=B
Cursor

B. Press **4** 6 times.

LOGO=Bi

C. Press **5** 6 times.

LOGO=Bi

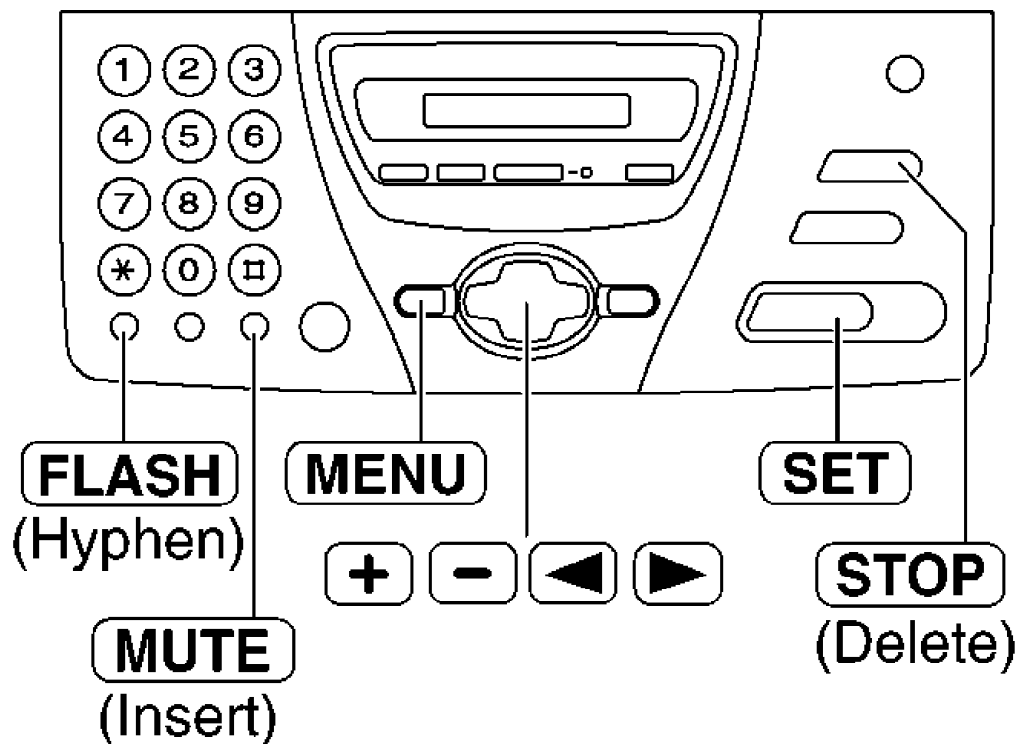
D. Press **▶** to move the cursor to the next space and press **5** 6 times.

LOGO=Bill

6. Press **SET**.

- The next feature will be displayed.

7. Press **MENU**.





Note:

- You can enter your logo by pressing **+** or **-** in step (5). In this

case, press  to move the cursor.

To correct a mistake



-Press  or  to move the cursor to the incorrect character, and make the correction.

To delete a character

-Move the cursor to the character you want to delete and press

STOP

To insert a character



1. Press  or  to move the cursor to the position where you want to insert the character.

2. Press **MUTE** to insert a space and enter the character.



1.16.4. TO SELECT CHARACTERS WITH THE DIAL KEYPAD

Pressing the dial keys will select a character as shown below.

Refer to **BUTTONCODE TABLE** ()

Keys	Characters
①	1 [] { } + - / = , . _ ` : ; ?
②	A B C a b c 2
③	D E F d e f 3
④	G H I g h i 4
⑤	J K L j k l 5
⑥	M N O m n o 6
⑦	P Q R S p q r s 7
⑧	T U V t u v 8
⑨	W X Y Z w x y z 9
⑩	Ã Õ Ç ã õ ç Á É Í Ó Ú á é í ó ú 0 () < > ! " # \$ % & ¥ * @ ^ ' →
FLASH	Hyphen button (To insert a hyphen.)
MUTE	Insert button (To insert one character or one space.)
STOP	Delete button (To delete a character.)
	► key (To move the cursor to the right.) To enter another character using the same number key, move the cursor to the next space.
	◄ key (To move the cursor to the left.)

1.16.5. TO SELECT CHARACTERS USING or

Instead of pressing the dial keys, you can select characters using  or 

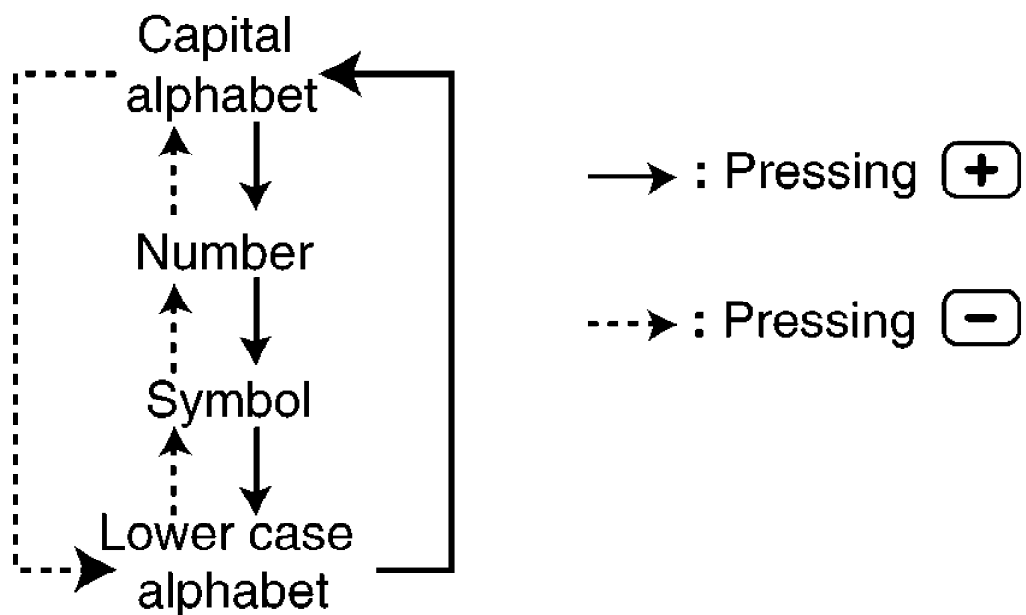
1. Press  or  until the desired character is displayed.

2. Press  to move the cursor to the next space.

- The character displayed in step 1 is inserted.

3. Return to step 1 to enter the next character.

Display order of characters



1.16.6. SETTING THE DIAL LOCK

The dial lock feature prevents the unit from calls being made to any numbers, except for pre-stored emergency telephone numbers.

1. Press **MENU** repeatedly until the following is displayed.

Display: Refer to **LCD MESSAGE ()** **BUTTONCODE TABLE ()**

DIAL LOCK

2. Press **SET**.

CODE=

3. Enter your PIN(Personal Identification Number) code, from 2 to 4 digits, using 0-9.

If you want to release the PIN code, refer to #531 on the **SERVICE FUNCTION TABLE ()**

4. Press **SET**

E01=

5. Enter an emergency telephone number, up to 30 digits, using the dial keypad.

6. Press **SET**.

- The next feature will be displayed.

E02=

7. If necessary, enter the second emergency telephone number using the dial keypad.

- If you do not need to enter, skip to step 8.

8. Press **SET**.

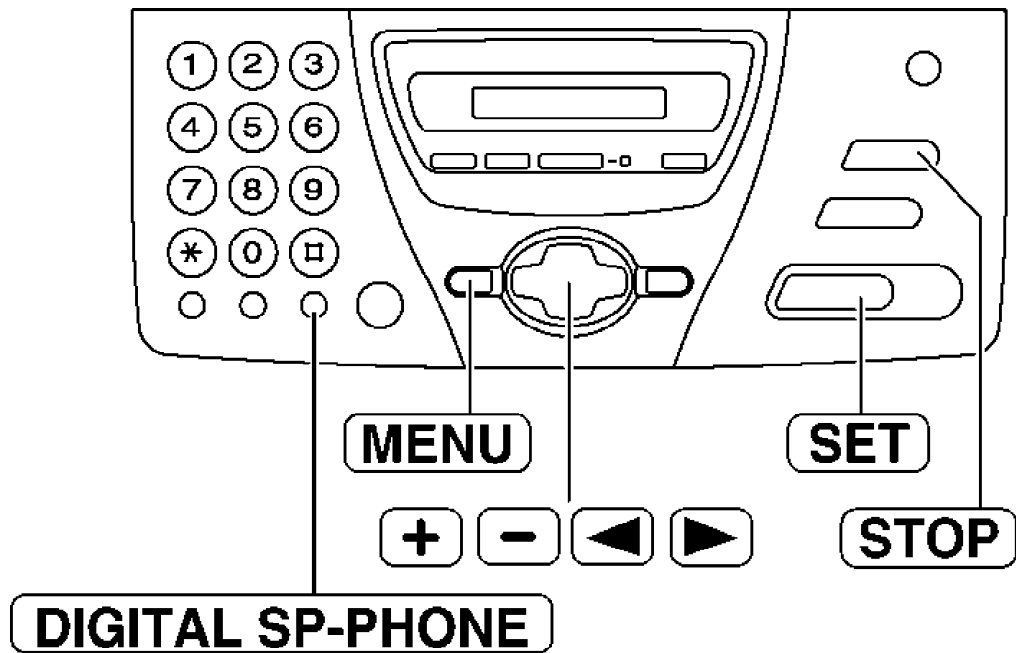
E03=

9. If necessary, enter the third emergency telephone number.

- If you do not need to enter, skip to step 10.

10. Press **SET**.

DIAL LOCK



Note:

1. You can also enter an emergency telephone number using the directory in steps 5,7 and 9. Press **[+]** or **[-]** until the desired name is displayed, then press **[SET]**.

2. Press **[SET]**.

To correct an emergency telephone number

1. Press **[Left Arrow]** or **[Right Arrow]** to move the cuesor to the incorrect number, and make the correction.
2. To delete a number, move the cursor to the number you want to delete, and press **[STOP]**.

Making an emergency call

1. Press

DIGITAL SP-PHONE

to lift the handset while the unit displays the following. / Display:

DIAL LOCK

-The display will show the following.

Example:

E01=0123456 [+]

2. Press **[+]** or **[-]** until the desired emergency telephone number is displayed. / Example:

E03=6543210 [+]

3. Press **SET**

-The unit will start dialing automatically.

-If any documents are in the document entrance, the unit will start fax transmission..

To cancel the dial lock

1. Press **MENU** repeatedly until the following is displayed

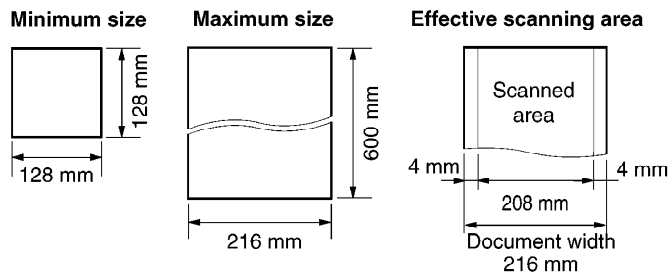
DIAL LOCK

2. Press **SET**

3. Enter your PIN code.

4. Press **SET**

1.16.7. DOCUMENTS YOU CAN SEND



Document weight

Single sheet:
45 g/m² to 90 g/m²

Multiple sheets (up to
10 sheets):
60 g/m² to 75 g/m²

Note:

Remove clips, staples or other similar fastening objects. / Check that ink, paste or correction fluid has dried. / Do not send the following types of documents. Use copies for fax transmission.

- Chemically treated paper such as carbon or carbonless duplicating paper
- Electrostatically charged paper
- Heavily curled, creased or torn paper
- Paper with a coated surface
- Paper with a faint image
- Paper with printing on the opposite side that can be seen through

the front (e.g. newspaper)

To transmit the document with a width of less than A4 SIZE (210 mm), we recommend using a copy machine to copy the original document onto A4 or letter-sized paper, then transmit the copied document.

1.17. MAINTENANCE ITEMS AND COMPONENT LOCATIONS

1.17.1. OUTLINE

MAINTENANCE AND REPAIRS ARE PERFORMED USING THE FOLLOWING STEPS.

1. Periodic maintenance

Inspect the equipment periodically and if necessary, clean any contaminated parts.

2. Check for breakdowns

Look for problems and consider how they arose. / If the equipment can be still used, perform copying, self testing or communication testing.

3. Check equipment

Perform copying, self testing and communication testing to determine if the problem originates from the transmitter, receiver or the telephone line.

4. Determine causes

Determine the causes of equipment problem by troubleshooting.

5. Equipment repairs

Repair or replace the defective parts and take appropriate measures at this stage to ensure that the problem will not recur.

6. Confirm normal operation of the equipment

After completing the repairs, conduct copying, self testing and communication testing to confirm that the equipment operates normally.

7. Record keeping

Make a record of the measures taken to rectify the problem for future reference.

1.17.2. MAINTENANCE CHECK ITEMS/COMPONENT LOCATIONS

1.17.2.1. MAINTENANCE LIST

NO.	OPERATION	CHECK	REMARK
1	Document Path	Remove any foreign matter such as paper.	—
2	Rollers	If the roller is dirty, clean it with a damp cloth then dry thoroughly.	See MAINTENANCE INSTRUCTIONS
3	Thermal Head	If the thermal head is dirty, clean the printing surface with a cloth moistened with denatured alcohol (alcohol without water), then dry thoroughly.	See MAINTENANCE INSTRUCTIONS and DISASSEMBLY INSTRUCTIONS
4	Glass	If the glass is dirty, clean the with a dry soft cloth.	See MAINTENANCE INSTRUCTIONS
5	Sensors	Document sensor (PS1), Read position sensor (SW32), Recording paper/cover open sensor (SW1) Jam sensor (SW3).	See SENSOR SETTING and SENSORS AND SWITCHES () .
6	Abnormal, wear and tear or loose parts	If the glass is dirty, clean them with a dry soft cloth.	—

1.17.2.2. MAINTENANCE CYCLE

No.	Item	Cleaning Cycle	Replacement	
			Cycle	Procedure
1	Separation Roller (Ref. No. 10)	3 months	7 years* (100,000 documents)	See HOW TO REMOVE THE ROLLER
2	Separation Rubber (Ref. No. 12)	3 months	7 years* (100,000 documents)	See HOW TO REMOVE THE RUBBER
3	Feed Rollers (Ref. No. 7)	3 months	7 years* (100,000 documents)	See HOW TO REMOVE THE ROLLER
4	Thermal Head (Ref. No. 79)	3 months	7 years* (100,000 documents)	See HOW TO REMOVE THE THERMAL HEAD AND CUTTER UNIT ().

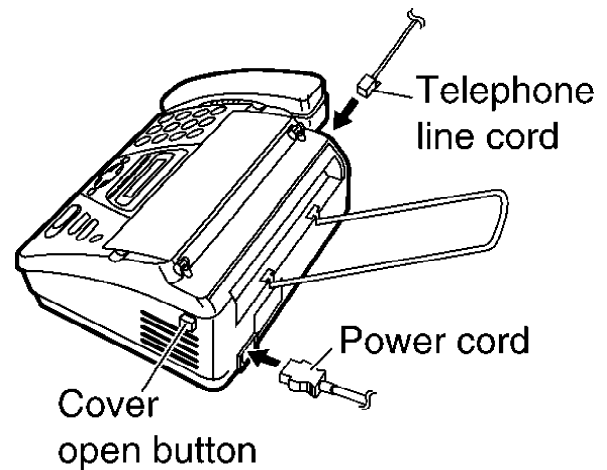
1.17.3. MAINTENANCE

1.17.3.1. CLEANING THE DOCUMENT FEEDER UNIT

If misfeeding of the document occurs frequently or if dirty patterns or black/white bands appear on the original document, when transmitting or copying clean the document feeder.

1 Disconnect the power cord and the telephone line cord.

2 Open the cover by pressing the cover open button.



3 Clean the document feeder rollers and rubber flap with a cloth moistened with isopropyl rubbing alcohol, and let all parts dry thoroughly.

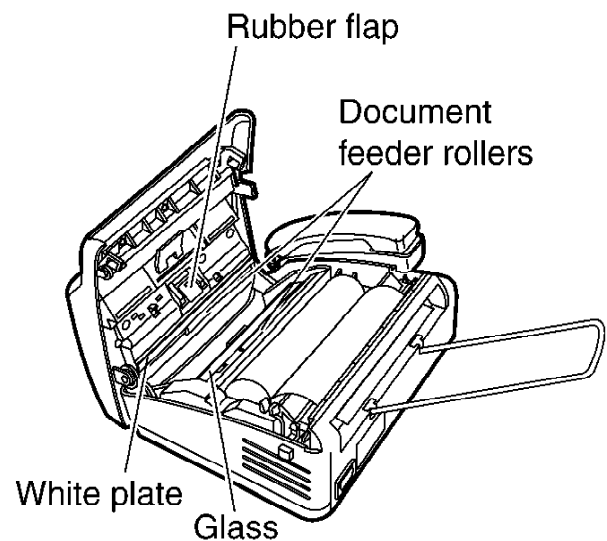
4 Clean the white plate and glass with a soft dry cloth.

5 Close the cover securely by pushing down on both sides.

6 Connect the power cord and the telephone line cord.

caution:

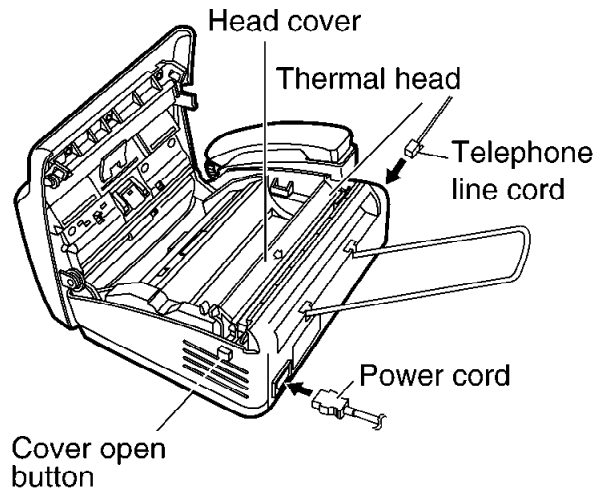
Do not use paper products, such as paper towels or tissues, to clean the inside of the unit.



1.17.3.2. CLEANING THE THERMAL HEAD

If dirty patterns or black/white bands appear on a copied or received document, clean the thermal head.

- 1 Disconnect the power cord and the telephone line cord.
- 2 Open the cover by pressing the cover open button and remove the recording paper roll.
- 3 Clean the thermal head with a cloth moistened with isopropyl rubbing alcohol, and let it dry thoroughly.
- 4 Connect the power cord and the telephone line cord.



- 5 Install the recording paper and close the cover securely by pushing down on both sides, then press .

FAX/START

Caution:

To prevent a malfunction due to static electricity, do not use a dry cloth and do not touch the thermal head directly with your fingers.

2. TROUBLESHOOTING GUIDE

2.1. TROUBLESHOOTING SUMMARY

2.1.1. TROUBLESHOOTING

After confirming the problem by asking the user, troubleshoot according to the instructions and observe the following precautions.

2.1.2. PRECAUTIONS

1. If there is a problem with the print quality or the paper feed, first check if the installation space and the print paper meets the specifications, the paper selection lever/paper thickness lever is set correctly, and the paper is set correctly without any slack.

2. Before troubleshooting, first check that the connectors and cables are connected correctly (not loose).
If the problem occurs randomly, check it very carefully.
3. When connecting the AC power cord with the unit case and checking the operation, exercise utmost care when handling electric parts in order to avoid electric shocks and short-circuits.
4. After troubleshooting, double check that you have not forgotten any connectors, left any loose screws, etc.
5. Always test to verify that the unit is working normally.

2.1.3. WHEN YOU DON'T KNOW HOW TO OPERATE THE UNIT, USE THE HELP FUNCTION

Refer to **BUTTONCODE TABLE** ()

- How to use:

1. press **HELP** repeatedly until the desired item is displayed.
2. press **SET**.

2.2. USER RECOVERABLE ERRORS

If the unit detects a problem, the following messages will appear on the display.

Refer to **LCD MESSAGE** ()

DISPLAY MESSAGE	CAUSE AND SOLUTION
CALL SERVICE 1	-There is something wrong with the unit. Contact our service personnel. / [This error is displayed when the thermal head does not warm up. Check the thermistor on the thermal head and connector lead.]
CALL SERVICE 2	-This message appears when the gear is not in an idle state. Check the GEAR BLOCK and position sensor.
CHECK COVER	-The cover is open. Close it.
OUT OF PAPER	-The unit has run out of recording paper. Install a recording paper roll.
CHECK DOCUMENT	-The document was not fed into the unit properly. Reinsert the document. If misfeeding occurs frequently, check the document feeder rollers (Refer to NO DOCUMENT FEED ()) and try again. (Refer to DOCUMENT JAM ()) -Attempted to transmit a document longer than 600 mm. Press STOP to remove the document. Divide the document into two or more sheets and try again.
CHECK MEMORY	-Memory (telephone numbers, parameters, etc.) has been erased. Re-program. / [The backup battery on the digital board may be low or dead, so check it.]
DIRECTORY FULL	-There is no space to store new entries in navigator directory. Erase unnecessary entries.
FAX IN MEMORY	-The unit has a document in memory. See the other displayed message instructions to point out the document.

DISPLAY MESSAGE	CAUSE AND SOLUTION
MEMORY FULL	-There is not room left in memory to record a voice message. Erase unnecessary message.
NO RESPONSE	-The other part'ys FAX machine is busy or has run out of recording paper. Try again.
NO TAD GREETING	-Your TAD/FAX greeting message is not recorded. Record a message.
	-The voice guidance feature is set to off. Activate feature #47 on page 66. Pre-recorded greeting mess. adopted.
NO TRNS-GREET.	-Your transfer greeting message is not recorded .Record a message.
	-The voice guidance feature is set to off. Activate feature #47 on page 66. Pre-recorded greeting mess. adopted.
PAPER JAMMED	-A recording paper jam occurred. Clear the jammed paper.
POLLING ERROR	-The other party's fax machine dose not provide the polling function. Check with the other party.
REDIAL TIME OUT	-The other party's fax machine is busy or has run out of recording paper. Try again.
REMOVE DOCUMENT	-The document is jammed. Remove the jammed document.
TRANSMIT ERROR	-A transmission error occurred. Try again.
UNIT OVERHEATED	-The unit is too hot. Let the unit cool down.

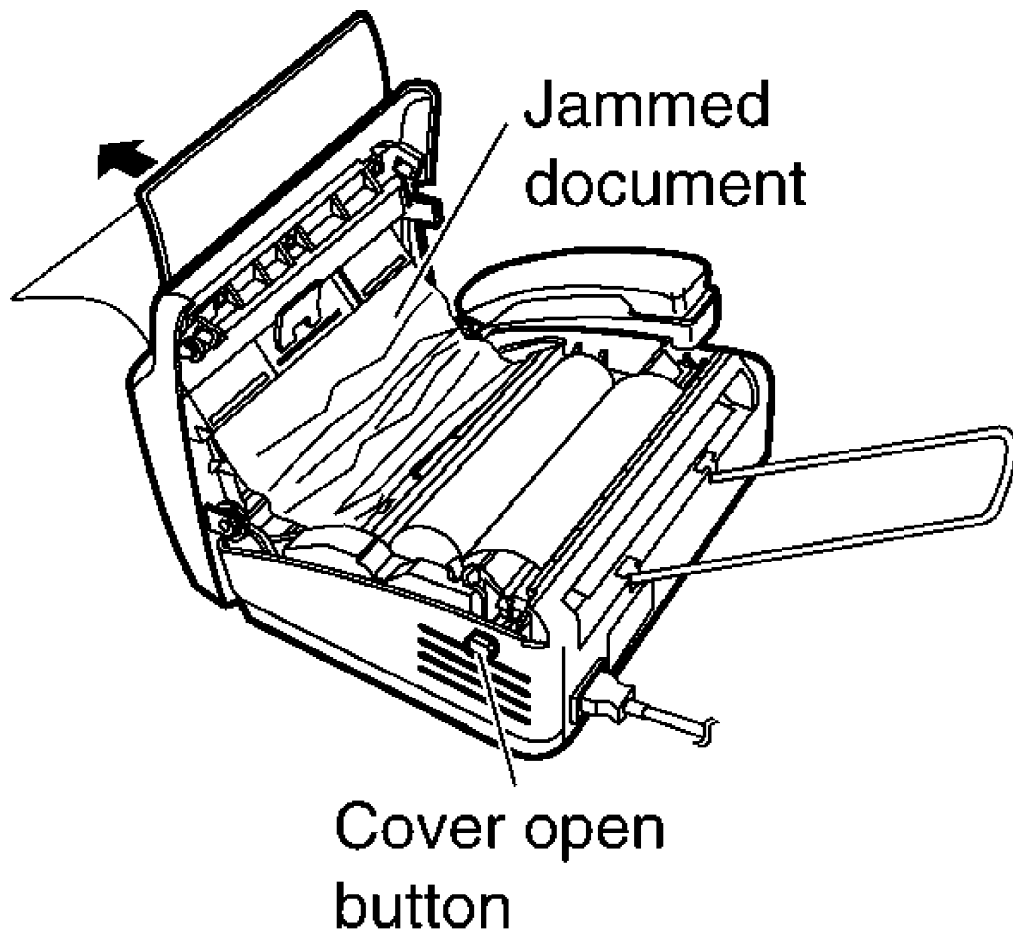
Notes: The explanations given in the [] are for servicemen only. /

2.2.1. DOCUMENT JAMS (SENDING)

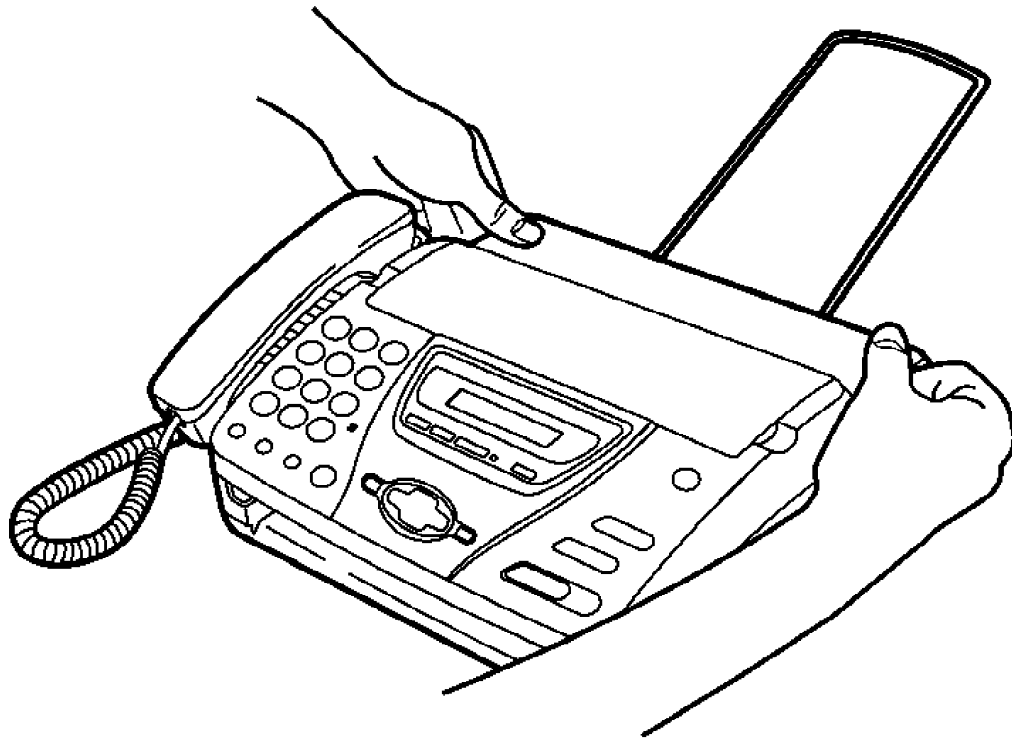
If the unit does not release during feeding, remove the jammed document.

1. Open the cover by pressing the cover open button and remove the jammed document carefully.

- Do not pull out the jammed document carefully.



2. Close the cover securely by pushing down on both sides.



2.2.2. RECORDING PAPER JAM

If the unit does not eject any recording paper during fax reception or copying, the recording paper has jammed. Remove the jammed paper.

1. Open the cover by pressing the cover open button. Lift the green lever to release the paper cutter, and remove the recording paper roll.

- In case the green lever is too hard to move

When paper jam is occurred or the paper cutter is not set to the proper position, the following operation returns the paper cutter to its home position automatically.

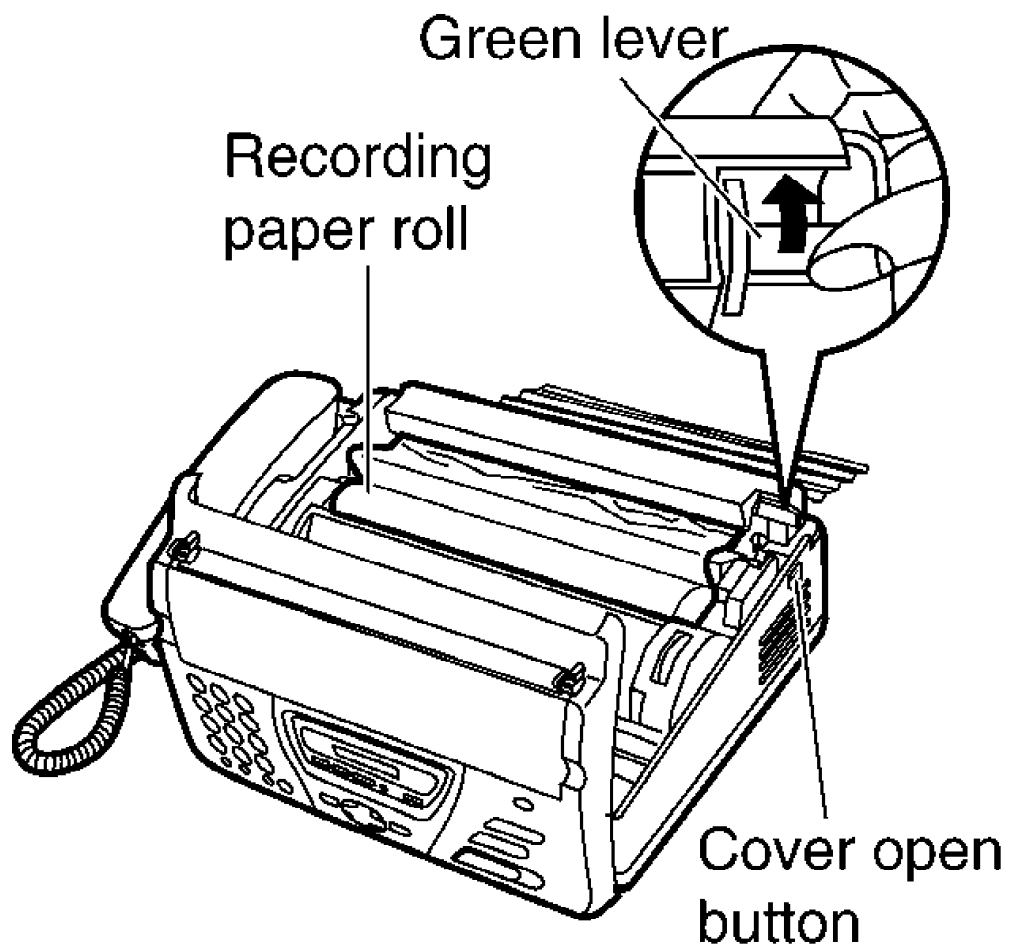
Procedure: / 1. Make sure that the paper is removed completely. (The paper cutter might be damaged if the following operation is executed with paper remained.)

2. Press [STOP] and [4] simultaneously.

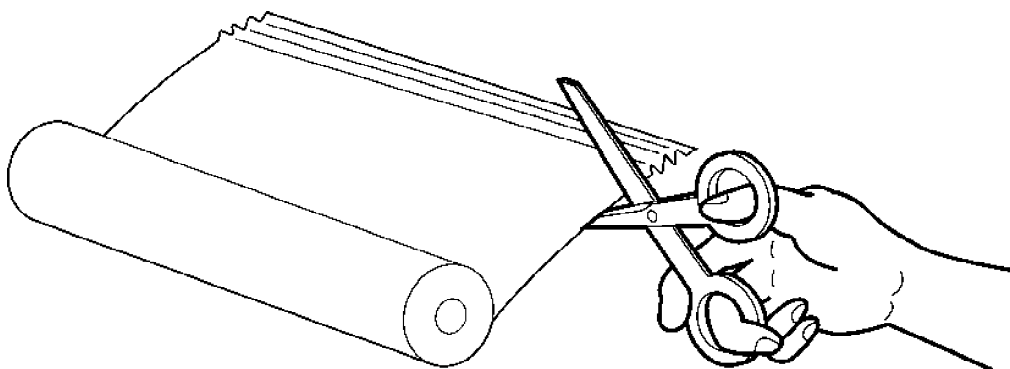
Note:

1. The operation can be done even while the cover is open, so be careful when executing it.

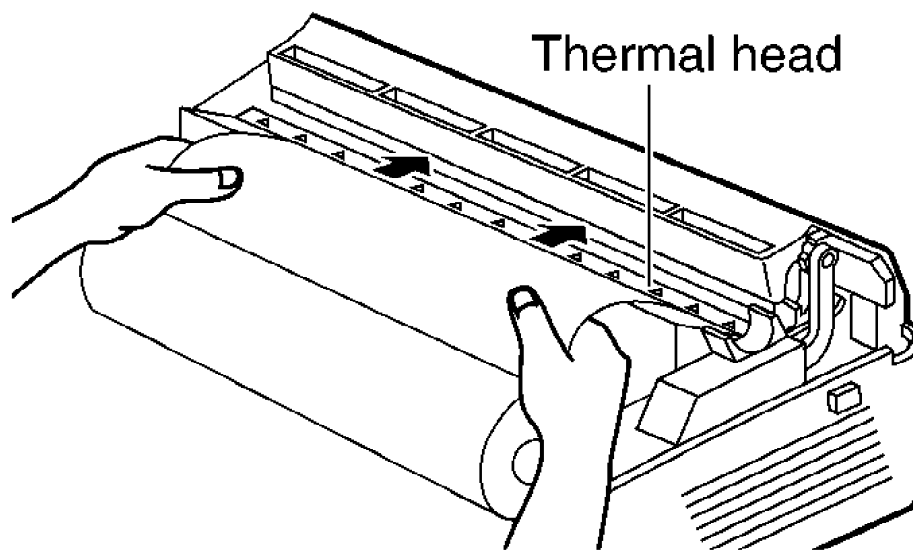
2. Use the unit after removing paper completely.



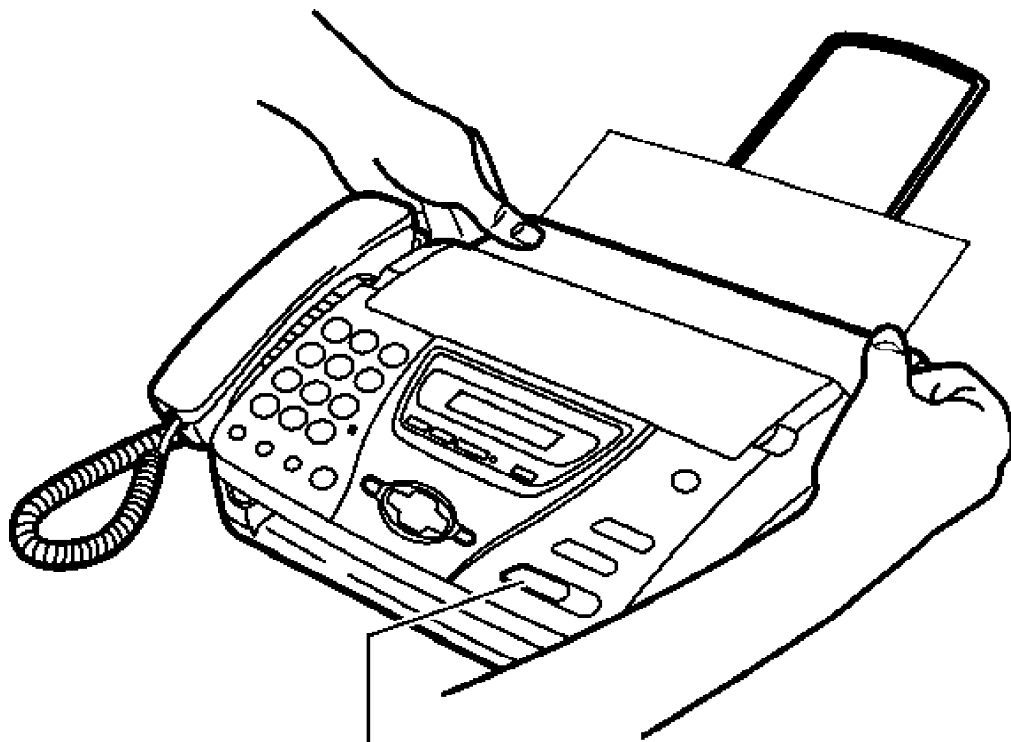
2. Cut off the wrinkled portion, and replace the recording paper roll into the unit in the proper direction.



3. Insert the leading edge of the paper into the opening above the thermalhead, and pull the paper out of the unit .



4. Close the cover securely by pushing down on both sides.



FAX/START

FAX/START

5. Press

- The unit will eject the paper slightly and cut it.

FAX/START

- If you do not press **FAX/START** within 30 seconds, the unit will automatically eject the paper slightly and cut it.
- Every time you close the cover a message will be printed. If the recording paper is set to the wrong side, a message will not be printed. Install the paper correctly.

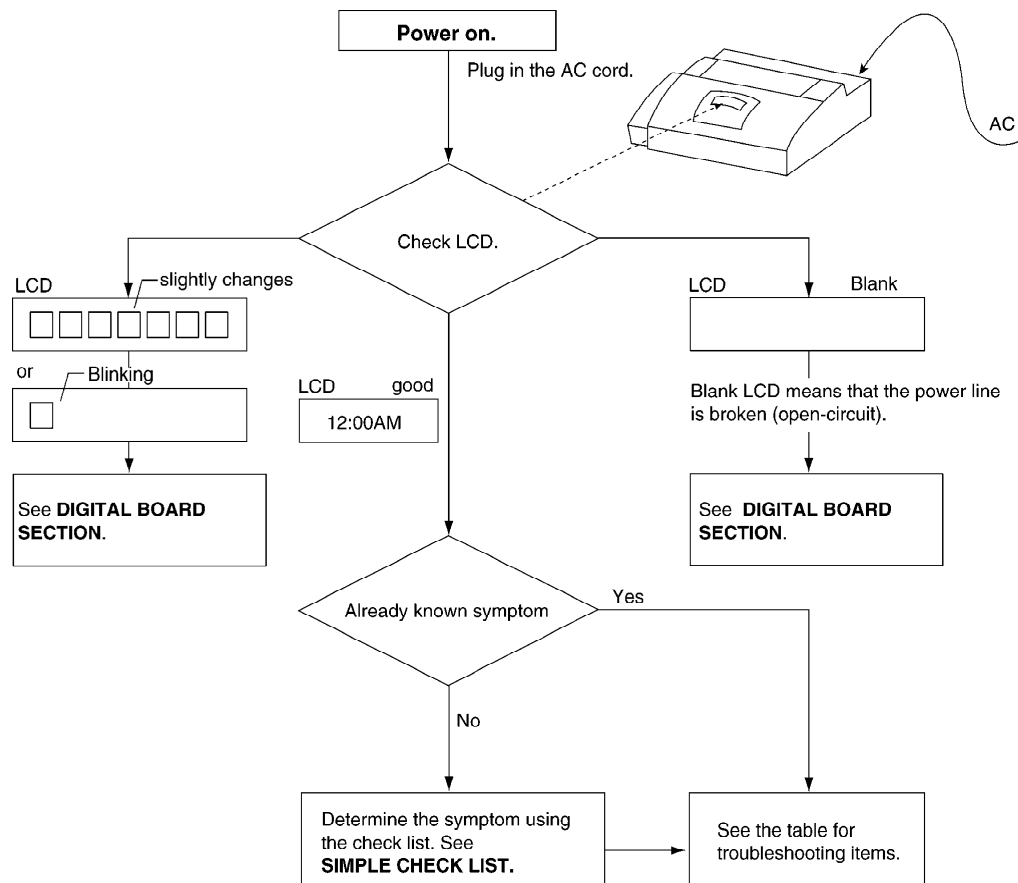
2.3. TROUBLESHOOTING DETAILS

2.3.1. OUTLINE

Troubleshooting guide provides a logical path of deduction to assist in locating a fault and suggests methods of restoring the unit to full working condition. Use the reported symptoms of the fault to determine the best troubleshooting method. Even difficult faults can be tracked to a specific block or area, for example, the "Digital Board" or "Image Sensor". / A variety of fault descriptions from customers often point to the same area and, for this reason, careful analysis of the reported symptoms is required. After every repair, test all functions to ensure no problems are evident.

2.3.2. STARTING TROUBLESHOOTING

Select the appropriate troubleshooting method according to the symptoms.



CROSS REFERENCE:
[SIMPLE CHECK LIST](#) ()
[DIGITAL BOARD SECTION](#) ()

2.3.3. TROUBLESHOOTING ITEMS TABLE

FUNCTION	SYMPTOM	REFERENCE
Printing	Skewed receiving image	See SKEWED RECEIVING IMAGE ()
	Expanded print	See EXPANDER PRINT (WHEN PRINTING)
	Image is distorted	See IMAGE IS DISTORTED (WHEN PRINTING)
	Black or White vertical lines appear.	See BLACK OR WHITE VERTICAL LINES APPEAR ()
ADF (Auto Document Feeder)	No feed	See NO DOCUMENT FEED ()
	Paper jam	See DOCUMENT JAM ()
	Multiple feed	See MULTIPLE FEED ()
	Skew	See SKEW ()
Abnormal mechanical sound	Abnormal sound from the product	See WHEN COPYING OR PRINTING, AN ABNORMAL SOUND IS HEARD FROM THE PRODUCT ()
Power supply	Voltage output is abnormal.	See POWER SUPPLY BOARD SECTION
Operation panel	keys are not accepted.	See OPERATION BOARD SECTION ()
Sensor	If the electric circuit is the cause, "REMOVE DOCUMENT" will be displayed.	See SENSOR SECTION ()
Communication FAX, TEL (Analog/Digital board)	Cannot communicate by fax.	See DEFECTIVE ITS (INTEGRATED TELEPHONE SYSTEM) SECTION ()
	Error code is displayed.	See HOW TO OUTPUT THE JOURNAL ()
	Cannot talk.	See ANALOG BOARD SECTION ()
	DTMF tone doesn't work.	
	Handset/Monitor sound, volume	

2.3.3.1. SIMPLE CHECK LIST

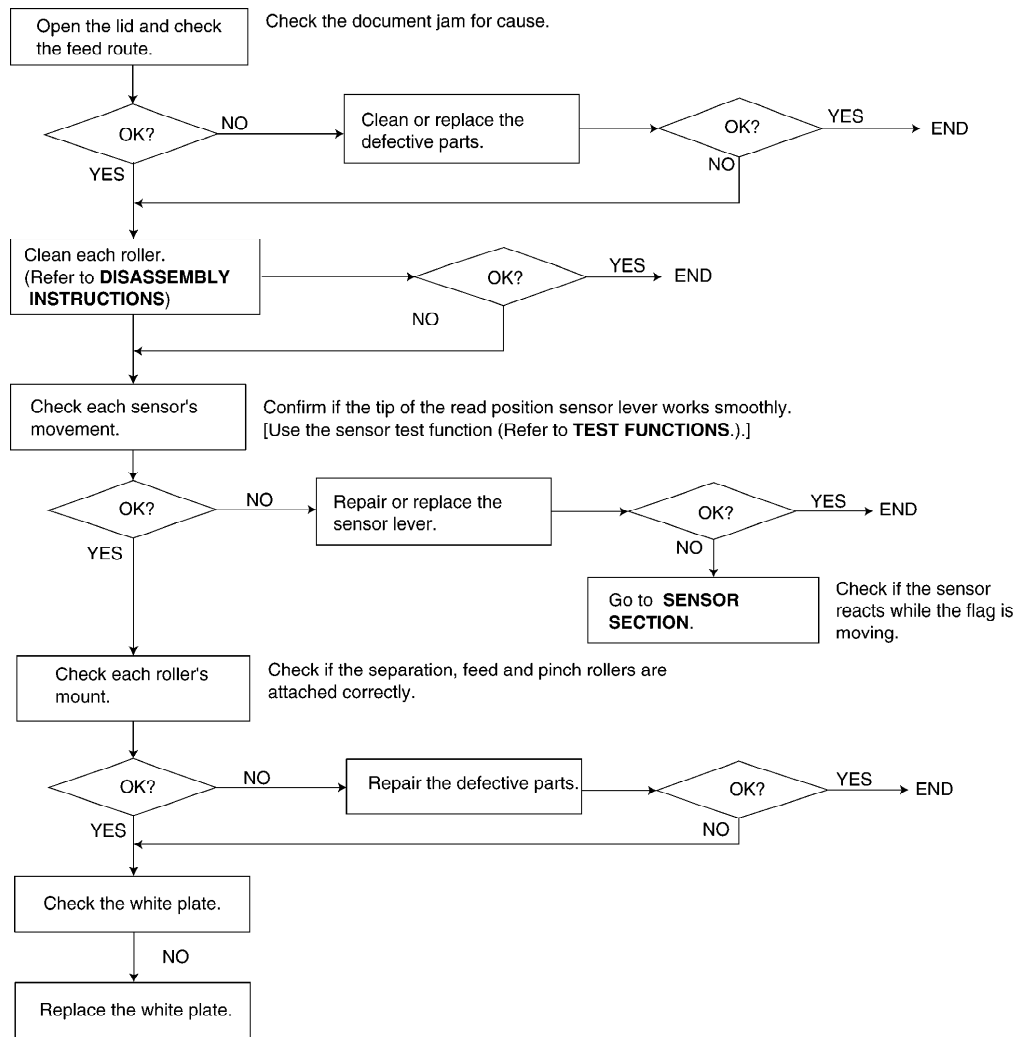
SERIAL NO.		DATE	
FUNCTION		JUDGEMENT	REFERENCE
FAX operation	Transmission	OK / NG	
	Receiving	OK / NG	
Copy operation	FINE mode	OK / NG	
	PHOTO mode	OK / NG	
Telephone operation	Handset transceiver / receiver	OK / NG	
	Monitor sound	OK / NG	
	Ringer sound	OK / NG	
	Dial operation	OK / NG	
	Volume operation	OK / NG	
Operation Panel	Key check	OK / NG	Service code #561 (Refer to TEST FUNCTION
	LCD check	OK / NG	Service code #558 (Refer to TEST FUNCTION
	LED check	OK / NG	Service code #557 (Refer to TEST FUNCTION
Sensor	Sensor check	OK / NG	Service code #815 (Refer to TEST FUNCTION
Clock		OK / NG	Is the time kept correctly? Check with another clock.
External Telephone	Handset transceiver/receiver	OK / NG	
	Remote control	OK / NG	Change to FAX receiving I pressing * 9. (Refer to code no. 041.on PROGRAM MODE TABLE

Note:

- Check according to the service code referring to the **TEST FUNCTIONS** ().

2.3.4. ADF (AUTO DOCUMENT FEED) SECTION

2.3.4.1. NO DOCUMENT FEED



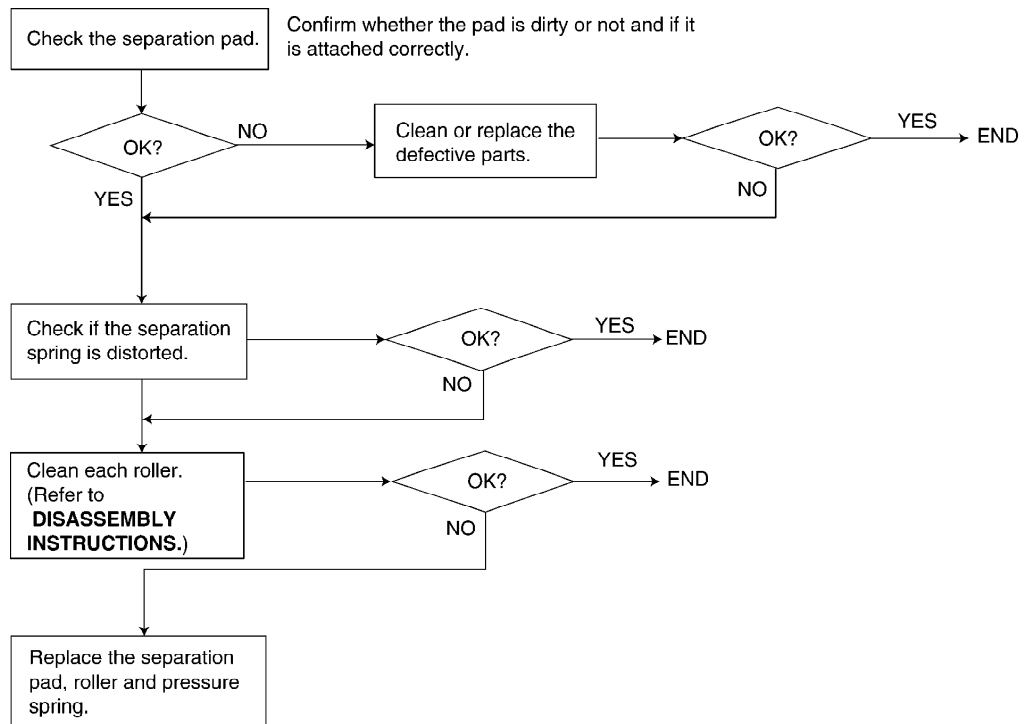
CROSS REFERENCE:

SENSOR SECTION ()

DISASSEMBLY INSTRUCTIONS ()

2.3.4.3. MULTIPLE FEED

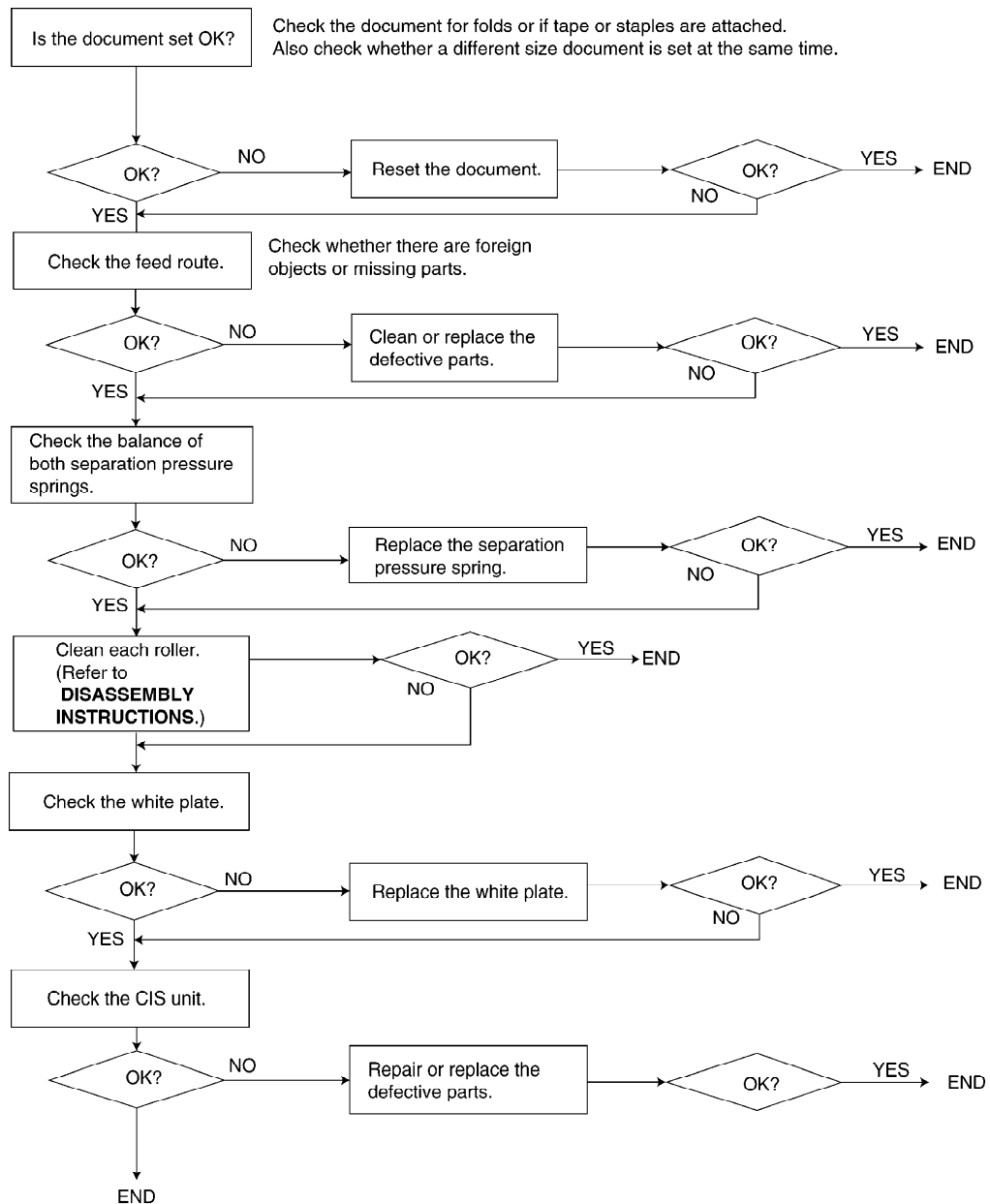
When using thick paper etc., If the document will not feed.



CROSS REFERENCE:

DISASSEMBLY INSTRUCTIONS ()

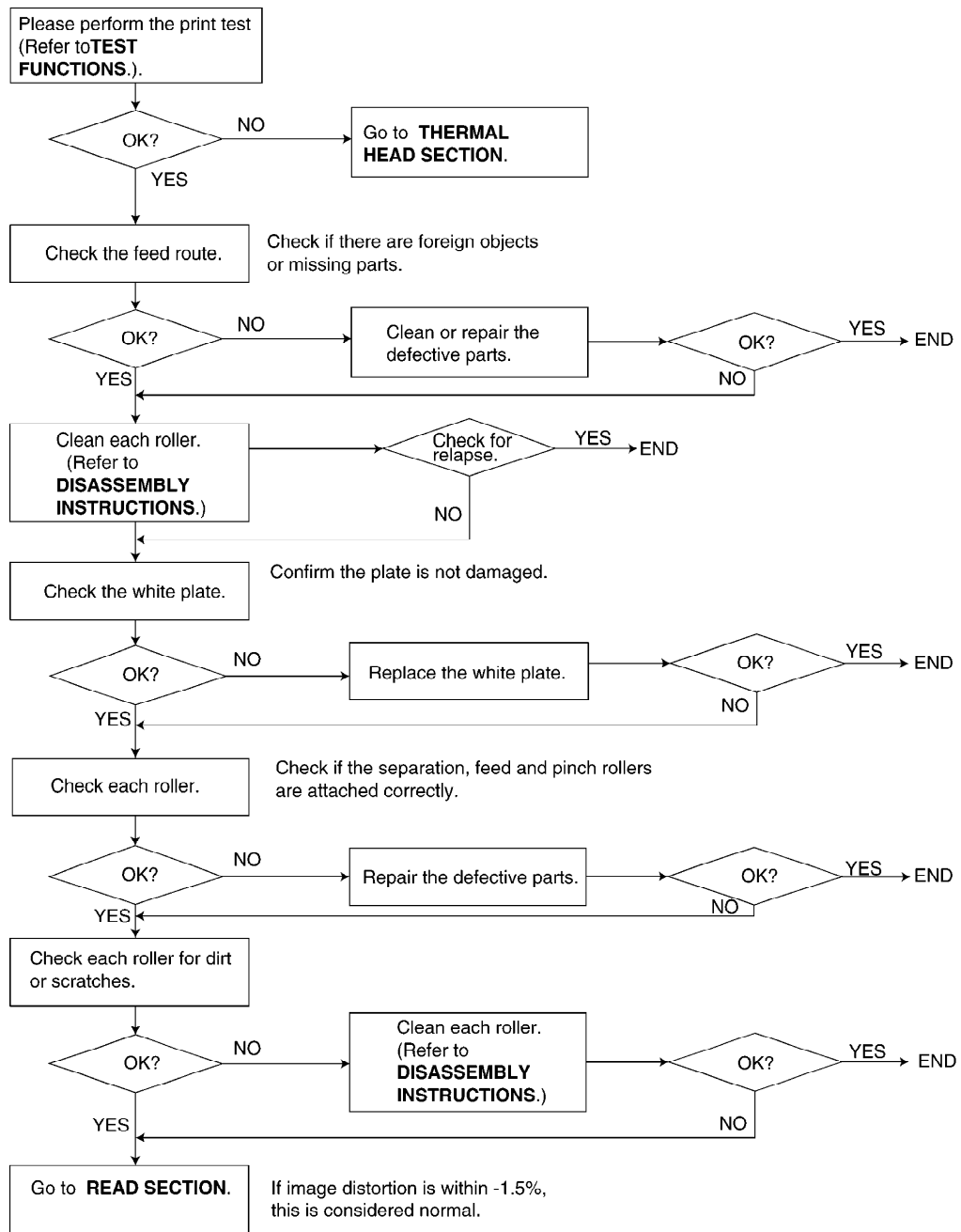
2.3.4.4. SKEW



CROSS REFERENCE:

DISASSEMBLY INSTRUCTIONS ()

2.3.4.5. IMAGE IS DISTORTED (WHEN PRINTING)



CROSS REFERENCE:

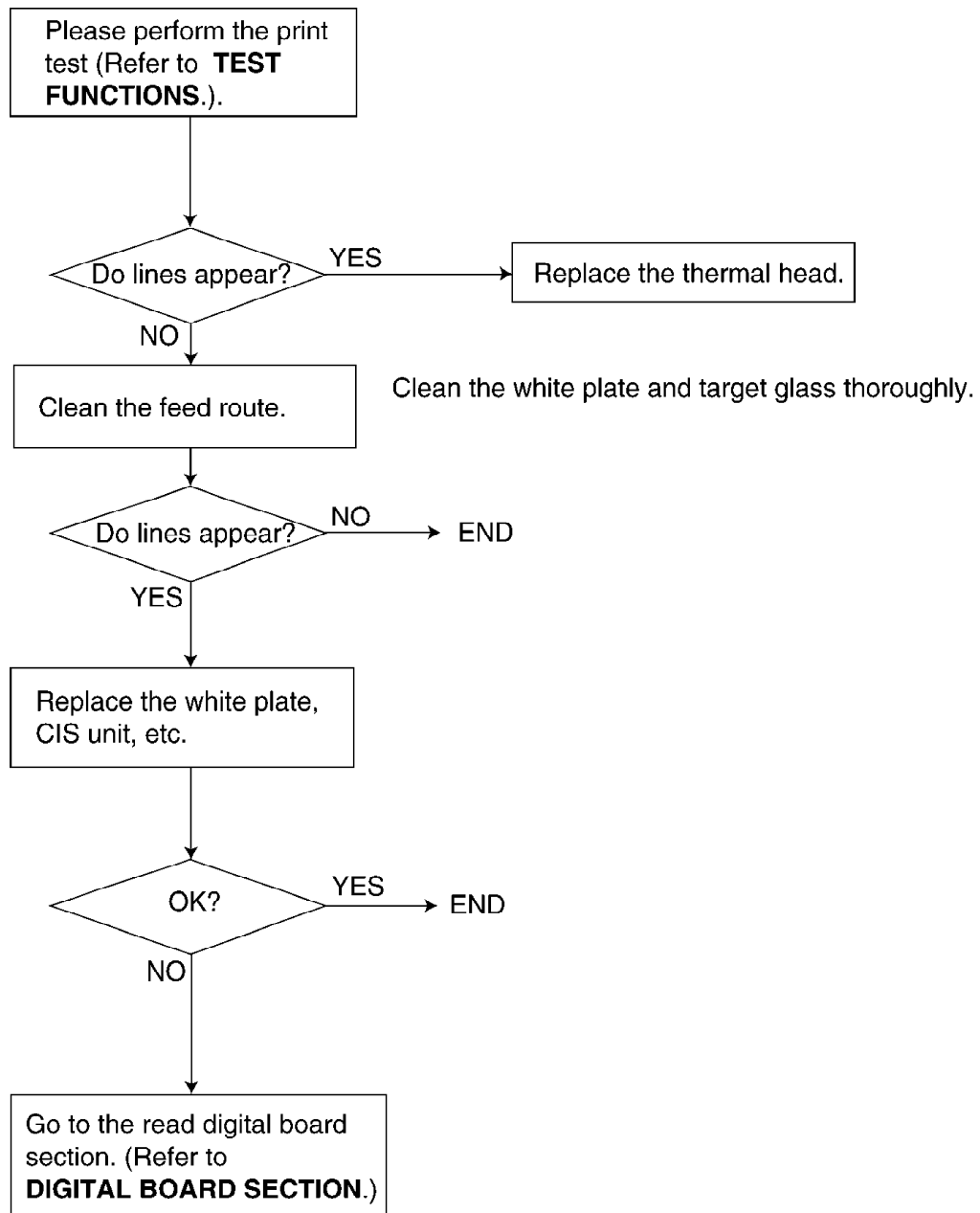
READ SECTION ()

THERMAL HEAD SECTION ()

TEST FUNCTIONS ()

DISASSEMBLY INSTRUCTIONS ()

2.3.4.6. BLACK OR WHITE VERTICAL LINES APPEAR

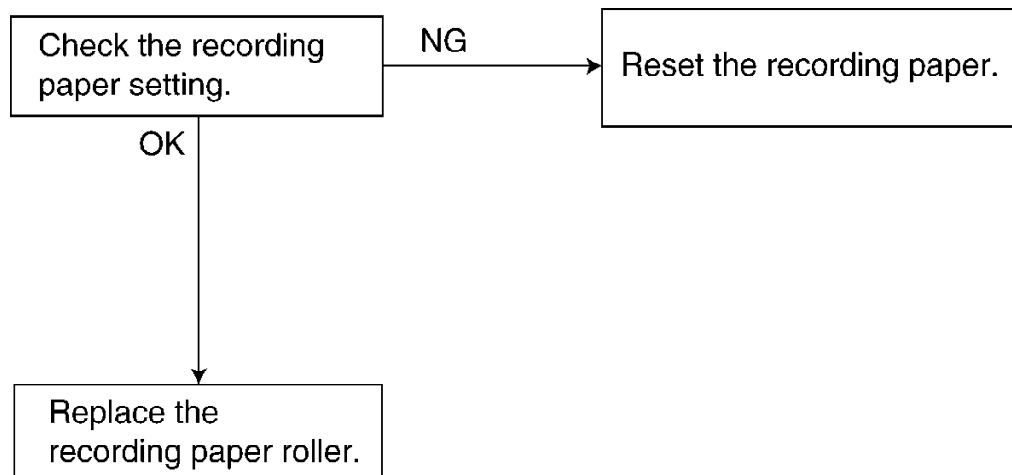


CROSS REFERENCE:

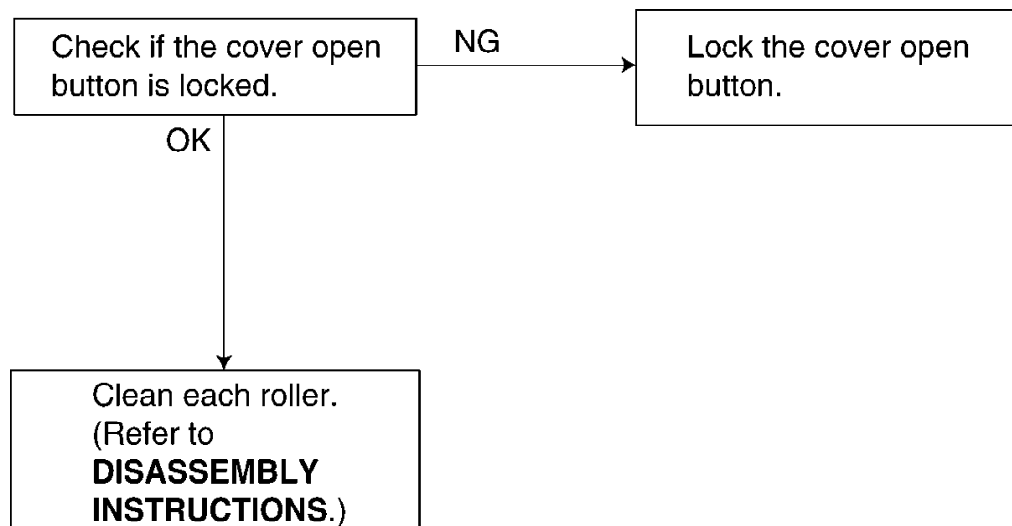
DIGITAL BOARD SECTION ()

TEST FUNCTIONS ()

2.3.4.7. SKEWED RECEIVING IMAGE



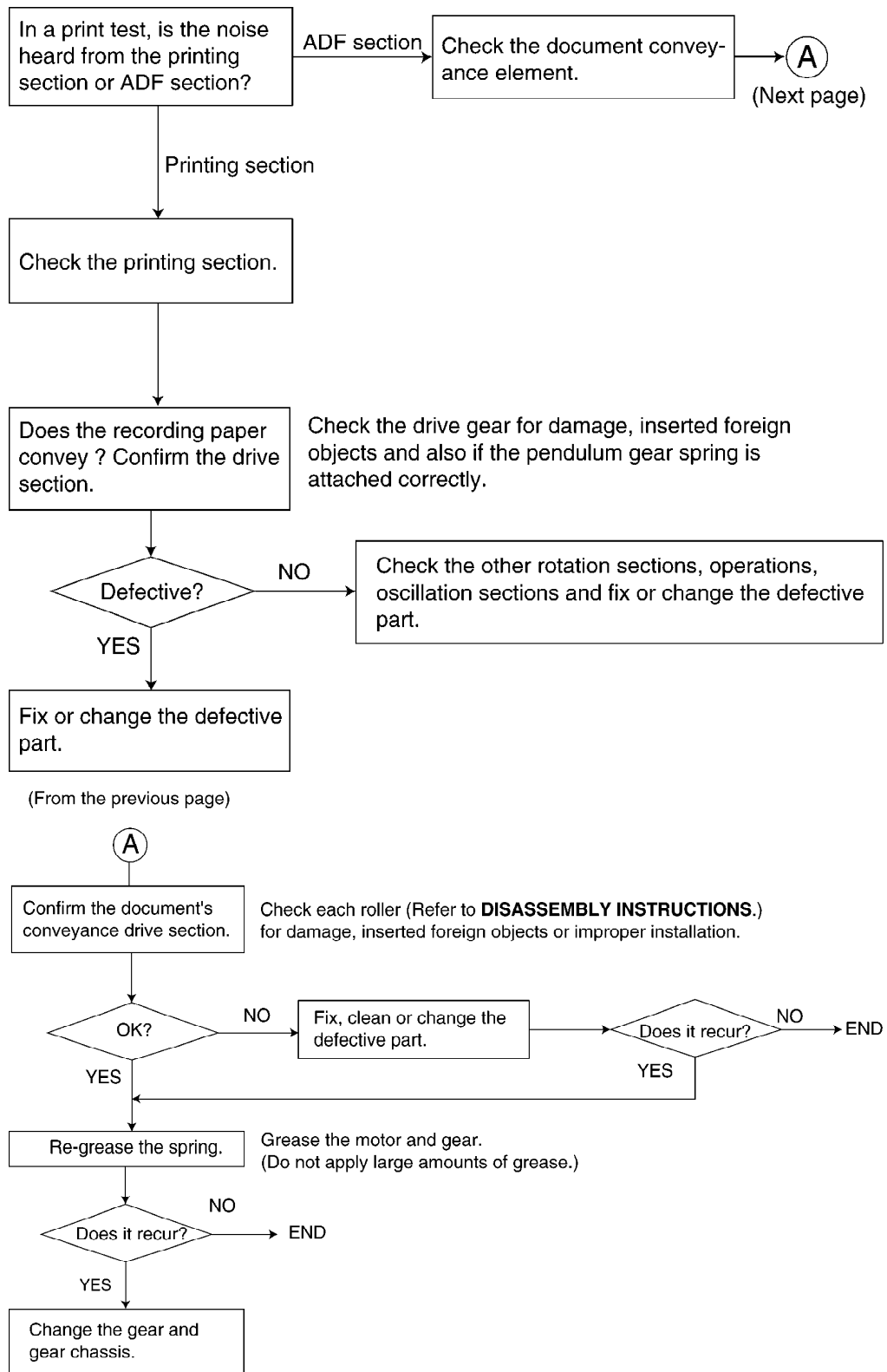
2.3.4.8. EXPANDER PRINT (WHEN PRINTING)



CROSS REFERENCE:

DISASSEMBLY INSTRUCTIONS ()

2.3.4.9. WHEN COPYING OR PRINTING, AN ABNORMAL SOUND IS HEARD FROM THE UNIT



CROSS REFERENCE:
DISASSEMBLY INSTRUCTIONS ()

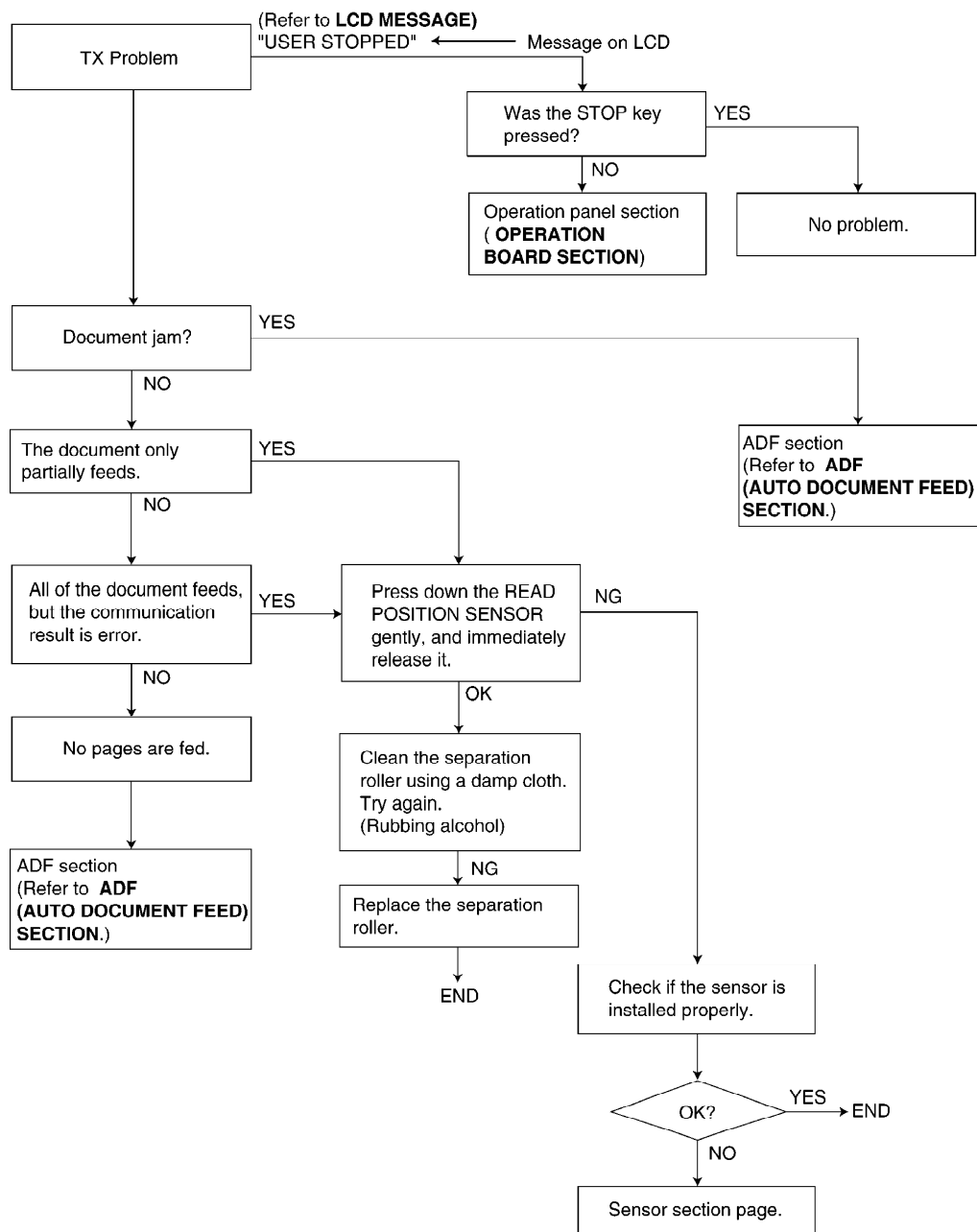
2.3.5. COMMUNICATION SECTION

Find the problem in the table shown below, and refer to the corresponding troubleshooting procedure in **DEFECTIVE FACSIMILE SECTION** ().

No.	Symptom	Content	Possible cause
1	The paper is not fed properly when faxing. (Copying is also not possible.)	Troubleshooting	Problem with the feeding mechanism.
2	The fax usually transmits successfully but sometimes fails. (Copying is possible.)	Troubleshooting	Problem with the service line or with the receiver's fax.
3	The fax receives successfully one time and fails another. (Copying is possible.)	Troubleshooting	Problem with the service line or with the transmitter's fax.
4	The fax completely fails to transmit or receive. (The unit can copy documents.)	Troubleshooting	Problem with the electric circuit.
5	The fax fails either to transmit or receive when making a long distance or an international call. (The unit can copy documents.)	Detailed description of the possible causes (Similar to troubleshooting items No.2 and No.3.)	Problem with the service line.
6	No.1-No.5	The troubleshooting procedure for each error code will be printed on the communication result report.	

2.3.5.1. DEFECTIVE FACSIMILE SECTION

2.3.5.1.1. TRANSMIT PROBLEM



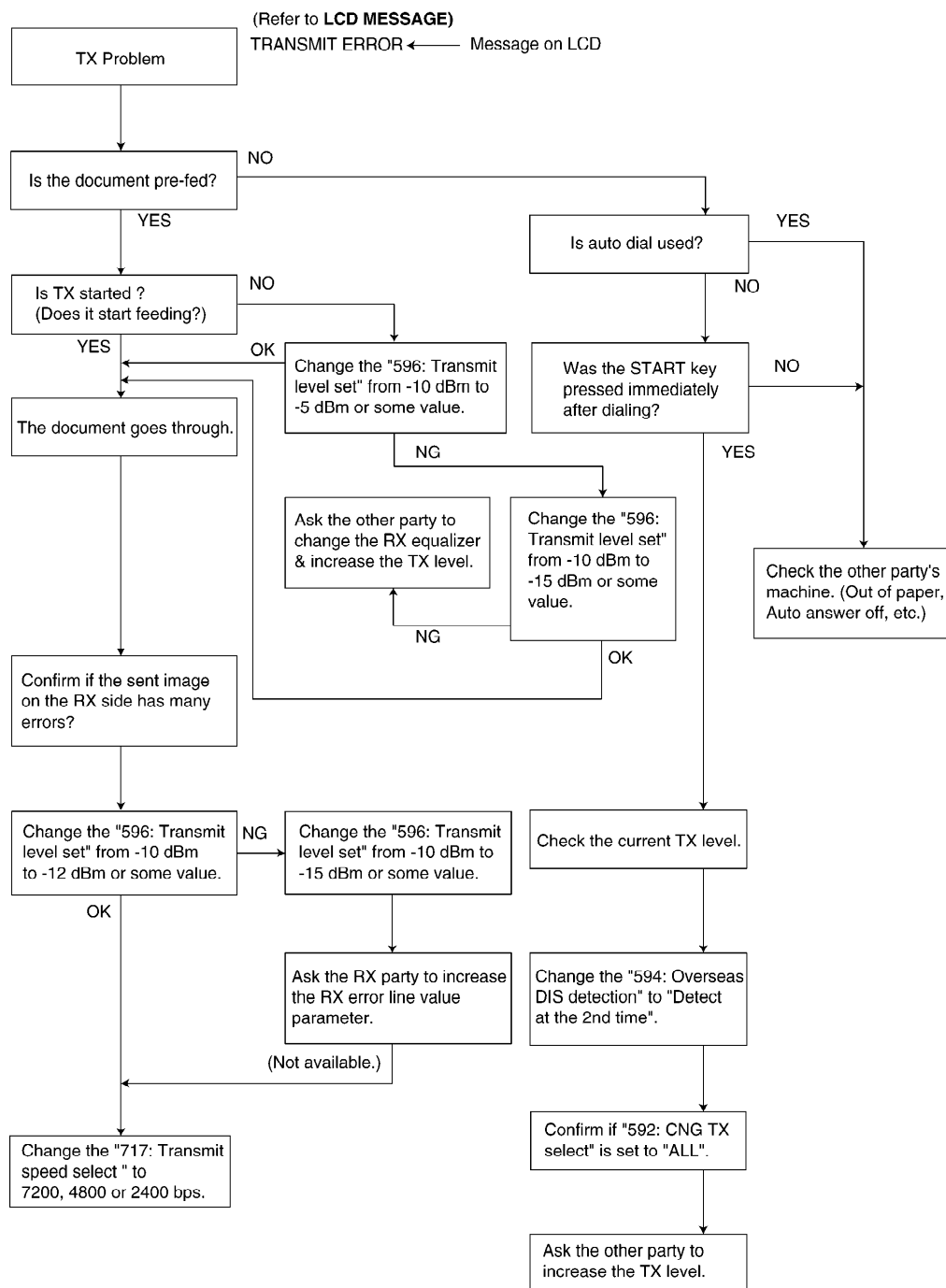
CROSS REFERENCE:

LCD MESSAGE ()

ADF (AUTO DOCUMENT FEED) SECTION ()

OPERATION BOARD SECTION ()

2.3.5.1.2. SOMETIMES THERE IS A TRANSMIT PROBLEM



CROSS REFERENCE:

LCD MESSAGE ()

2.3.5.1.3. RECEPTION PROBLEM

Confirm the following before starting troubleshooting. / Is the recording paper installed properly?

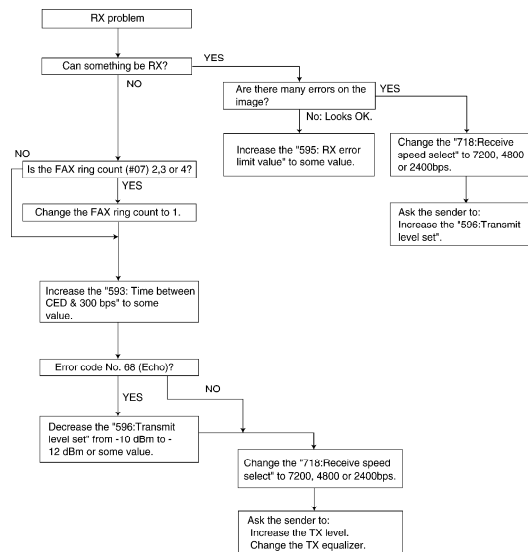
There is the receiving problem when sometimes the below errors may be occurred.

R efer to **LCD MESSAGE ()**

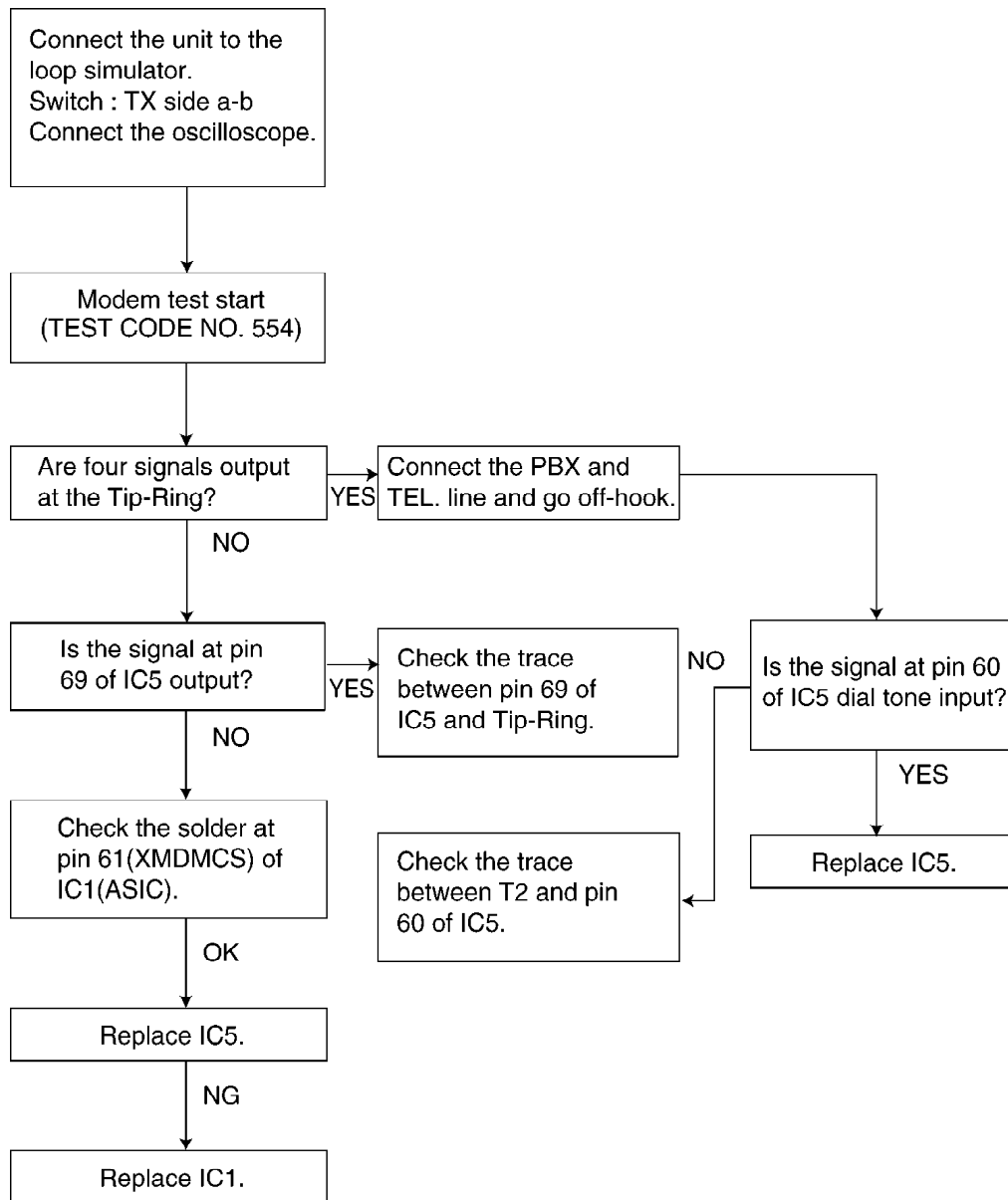
OUT OF PAPER / CHHECK COVER / UNIT OVERHEATED (If it doesn't return automatically,

COVER OPEN, etc., reset the unit.) / CHECK DOCUMENT

Please refer to **USER RECOVERABLE ERRORS** () for the above items. / Also, when a hardware deformity occurs, please check each sensor.



2.3.5.1.4. THE UNIT CAN COPY, BUT CANNOT TRANSMIT/RECEIVE



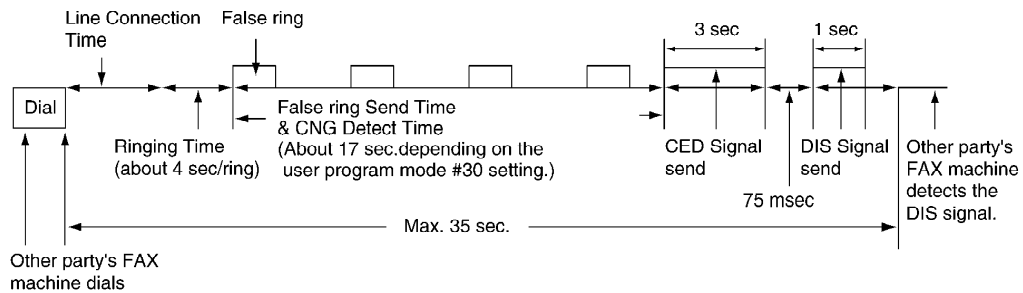
2.3.5.1.5. UNIT CAN COPY, BUT CANNOT TRANSMIT/RECEIVE LONG DISTANCE OR INTERNATIONAL COMMUNICATIONS

The following 2 causes can be considered for this.

Cause 1:

The other party is executing automatic dialling, the call has been received by this unit, and the CED or DIS signal response time is too long. (In most cases, this unit detects the CNG signal and can respond to the CED or DIS.) (According to the ITU-T standard, the communication procedure is stopped when there is no response from the other party within 35 sec, so that the other party releases the line.)

(Response time)

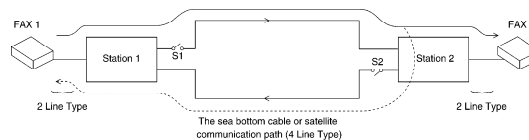


(Cause and Countermeasure)

As shown in the chart above, the total handshaking time must be reduced. Long distance connection and linking of several stations means the line connection time cannot be reduced. Accordingly, the following countermeasures should be attempted. / (A) The TEL/FAX DELAYED RING count should be 1. (User parameter: code No. 78) / (B) As the 35 sec. count starts directly after dialing or directly after the START button has been pressed for models with a START button, the other party should be called manually, if possible. / Another possibility is entering two pauses at the end of the auto dial number on the transmission side. Then the count start time will be delayed for 2 pauses (about 10 sec.).

Cause 2:

Erroneous detection due to an echo or echo canceler.



(Echo/Echo Canceler)

The signal from FAX1 reaches FAX2 via the stations 1 and 2, but the reflection signal at station 2 also returns via station 1(echo). As the distance between station 1 and station 2 is far, the echo returns to FAX 1 a max. of 600 msec after transmission. There is a possibility that this signal is detected erroneously as the signal from FAX2. For a normal call, there is a possibility that the echo of their own voice will make the call difficult to understand. For this reason, each station (station 1, station 2) attaches echo cancellers (S1, S2) for international lines or long distance lines. For the echo canceler, the level of the transmission signal from FAX 1 is compared with the level of the reception signal from FAX2. When the S1 is closed and S2 is open, so that the echo does not return to FAX1.

(Causes and Countermeasures)

No.	Countermeasure Side	Echo Communication Problem Example	Countermeasure	Service
1	Sending side	Some time is needed to compare the level of the receiving and sending signals for the echo canceler. The header of the training signal lacks due to a switching delay to close S1.	Add a dummy signal to the beginning of the training signal.	Service code (International selection) This countermeasure becomes the value
2	Receiving side	The echo canceler function stops according to a CED signal frequency of 2100Hz (S1 and S2 are both ON), a DIS signal is returned as an echo, and a DCS signal from the sending side overlaps the DIS echo. Then the receiving side FAX cannot retrieve the DCS signal. (Refer to Fig. a)	Change to a 1100Hz CED signal frequency. (Refer to Fig. b)	Service code (CED frequency selection)
	Receiving side		Change the regular time of 75 msec between the CED signal and DIS signal to 500 msec. This will give at least 250 msec to recover the echo canceler operation. (Refer to Fig. c)	Service code (Time between CED and DIS)
	Sending side		The sending side FAX sends a DCS signal not after receiving the 1st DIS signal but after receiving the 2nd DIS signal. (Refer to Fig. d)	Service code (Overseas detection)
3	Sending side	Communication failure occurs in a long distance communication on the telephone line without an echo canceler.	Decrease the transmission level from -10 dBm to -15 dBm and the echo level will decrease.	Service code (Transmit level)
4	Sending side Receiving side	or	Decrease the receiving sensitivity from -13 dBm to about -32 dBm so an echo signal will not be received.	Service code (Receiving sensitivity)
5	Sending side Receiving side	There are some cases (e.g. Mobil comms.) which cause the collision of TX / RX signals due to the delay / echo and noise of the network / terminal. (Refer to Fig. e)	Set additional Pause time (Service mode: code No. 774) in between the original and its repeated signals, to prevent the collision of the signals at both ends.	Service code (T4 time)

Fig. a (Overlapping the Echo of the DIS signal and DCS signal)

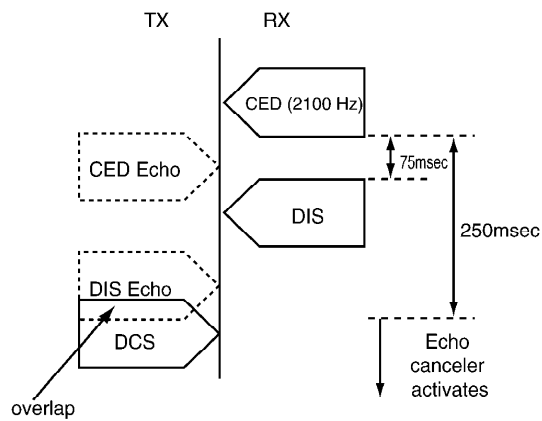


Fig. b (Countermeasure by Changing the CED Frequency)

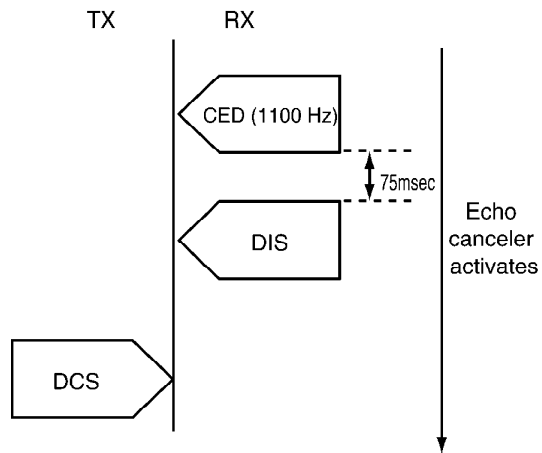


Fig. c (Countermeasure by Changing the Interval Between CED and DIS)

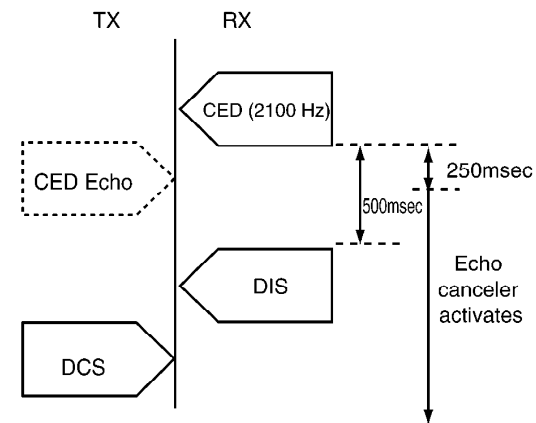
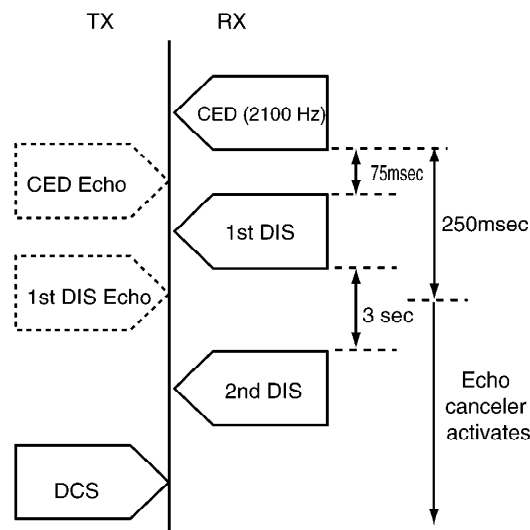
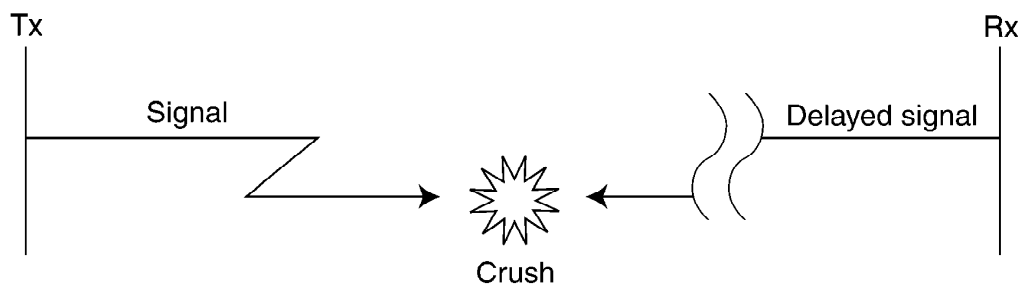


Fig. d (Countermeasure by Ignoring the 1st DIS)



<TX side signal>	<RX side signal>	<Countermeasure>
2nd / 3rd DCS / Training	& delayed CFR / FTT	at TX side
2nd / 3rd EOP / EOM / MPS	& delayed MCF / PIP / PIN / RTP / RTN	at TX side
delayed DCS	& 2nd / 3rd / --- DIS	at RX side

(Fig. e)



2.3.5.1.6. THE UNIT CAN COPY, BUT THE TRANSMISSION AND RECEPTION IMAGE ARE INCORRECT

(Long distance or international communication operation)

This symptom highly depends on the transmission and reception capability of the other FAX unit and the line conditions.

The countermeasures for this unit are shown below.

Transmission Operation:

Set the transmitting speed to 4800BPS (service mode: code No. 717) or select the overseas mode.

Reception Operation:

If 80% or more of the reception is incorrect, set the receiving speed to 4800BPS. (Service mode: code No. 718)

- Refer to **SERVICE FUNCTION TABLE()**.

2.3.5.1.7. HOW TO OUTPUT THE JOURNAL REPORT:

1. Press **MENU** repeatedly until the following is displayed.
2. Press **SET**.
3. Press **◀** or **▶** until the “ JOURNAL REPORT ” is displayed.
4. The report is printed out.

Ejemplo de un informe de comunicaciones de la jornada

[RELATÓRIO DE TRANSMISSÃO]									
NO.		OUTGO FAX-S/MILE	INCLIO	DURADA	MOD	ESTADO	RESULTADO		
01	02		01 JAN 00:02	00'31	SND	01	OK		
02		(FAX COM PROBLEMA)	01 JAN 00:03	00'25	RCV	01	OK		83

(3) TRANS: Sent directly
 RECEP: Received directly
 (2) Communication message
 (1) Error code

Error code table:

Refer to **ERROR CODE TABLE ()**

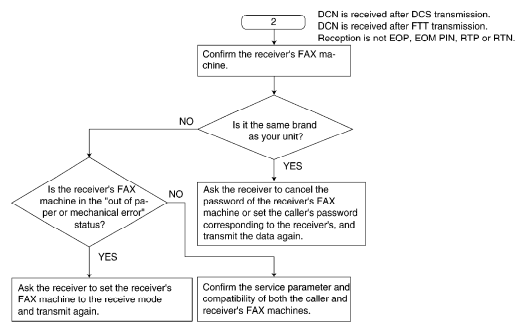
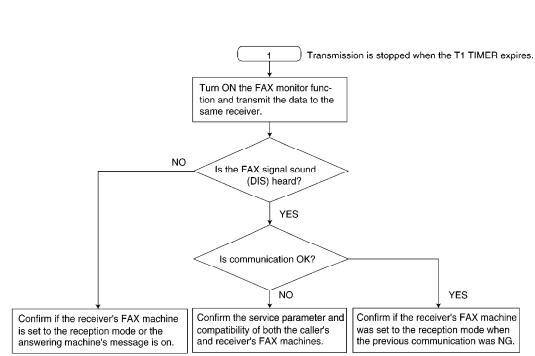
(1) CODE	(2) RESULT	(3) MODE	SYMPTOM	C n
	PRESSED THE STOP KEY	SND & RCV	Communication was interrupted by the STOP button.	
	DOCUMENT JAMMED	SND	The document paper is jammed.	
	NO DOCUMENT	SND	No document paper.	
	PRINTER OVERHEATED	RCV	The thermal head is overheated.	
	PAPER OUT	RCV	Out of thermal paper or the cover is open.	
40	OTHER FAX NOT RESPOND	SND	Transmission is stopped when the T1 TIMER expires.	
41	COMMUNICATION ERROR	SND	DCN is received after DCS transmission.	
42	COMMUNICATION ERROR	SND	FTT is received after transmission of a 2400BPS training signal.	
43	COMMUNICATION ERROR	SND	No response after post message is transmitted three times.	
44	COMMUNICATION ERROR	SND	RTN and PIN are received.	
46	COMMUNICATION ERROR	SND	No response after FTT is transmitted.	
48	COMMUNICATION ERROR	SND	No post message.	
49	COMMUNICATION ERROR	SND	RTN is transmitted.	
50	COMMUNICATION ERROR	SND	PIN is transmitted (to PRI-Q).	

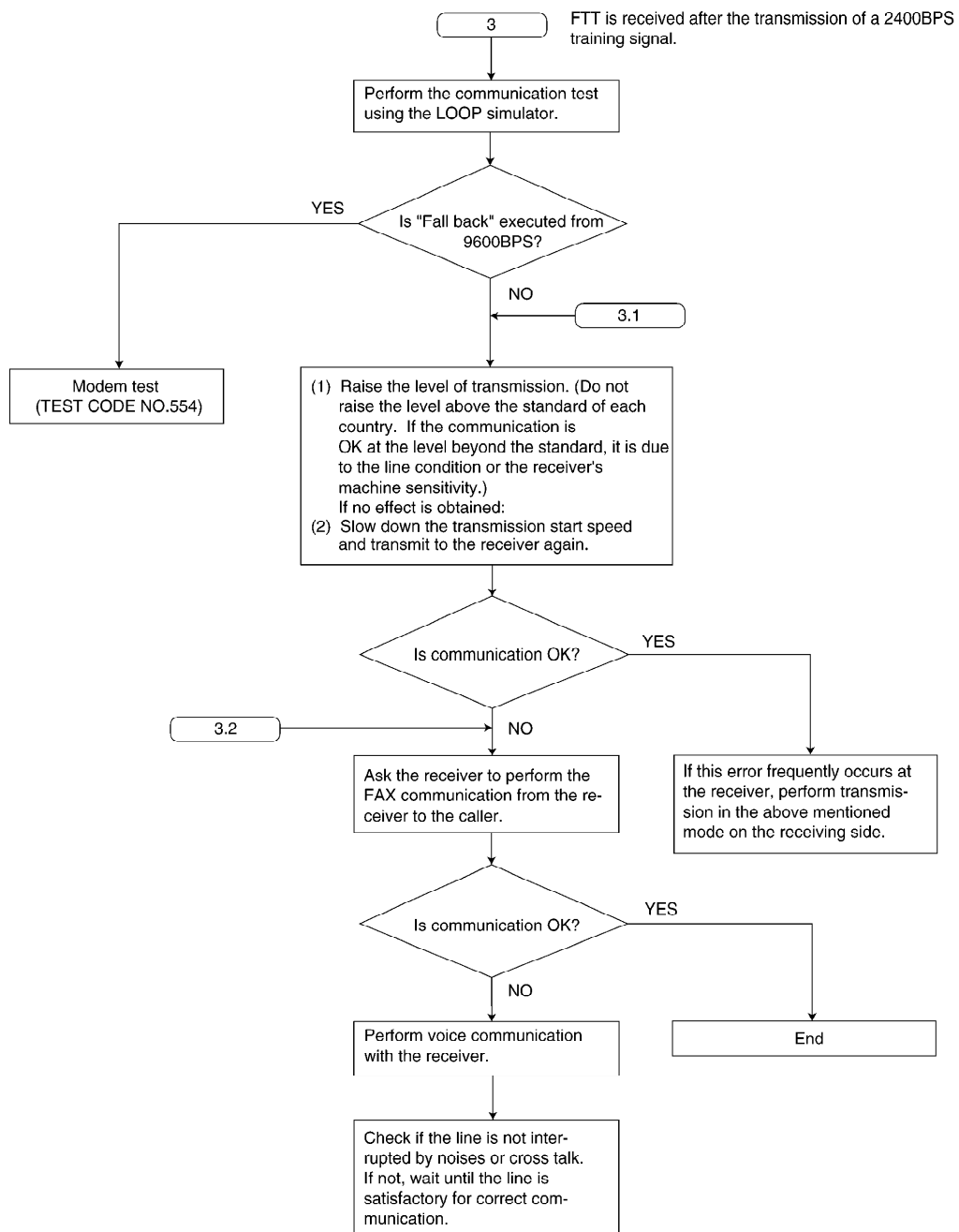
(1) CODE	(2) RESULT	(3) MODE	SYMPTOM	C n
51	COMMUNICATION ERROR	SND	PIN is transmitted.	
52	OTHER FAX NOT RESPOND	SND	Reception is finished when the T1 TIMER expires.	
53	ERROR-NOT YOUR UNIT	RCV	DCN is received after transmission of NSC and DTC.	
54	ERROR-NOT YOUR UNIT	RCV	DCN is received after transmission of NSC .	
57	COMMUNICATION ERROR	SND	300bps error	
58	COMMUNICATION ERROR	RCV	DCN is received after FTT transmission.	
59	ERROR-NOT YOUR UNIT	SND	DCN responds to a post message.	
64	COMMUNICATION ERROR	SND	Polling is not possible.	
68	COMMUNICATION ERROR	RCV	No response at the other party after MCF or CFR is transmitted.	
70	ERROR-NOT YOUR UNIT	RCV	DCN is received after CFR transmission.	
72	COMMUNICATION ERROR	RCV	The carrier is cut when the image signal is received.	
FF	COMMUNICATION ERROR	SND & RCV	Modem error.	

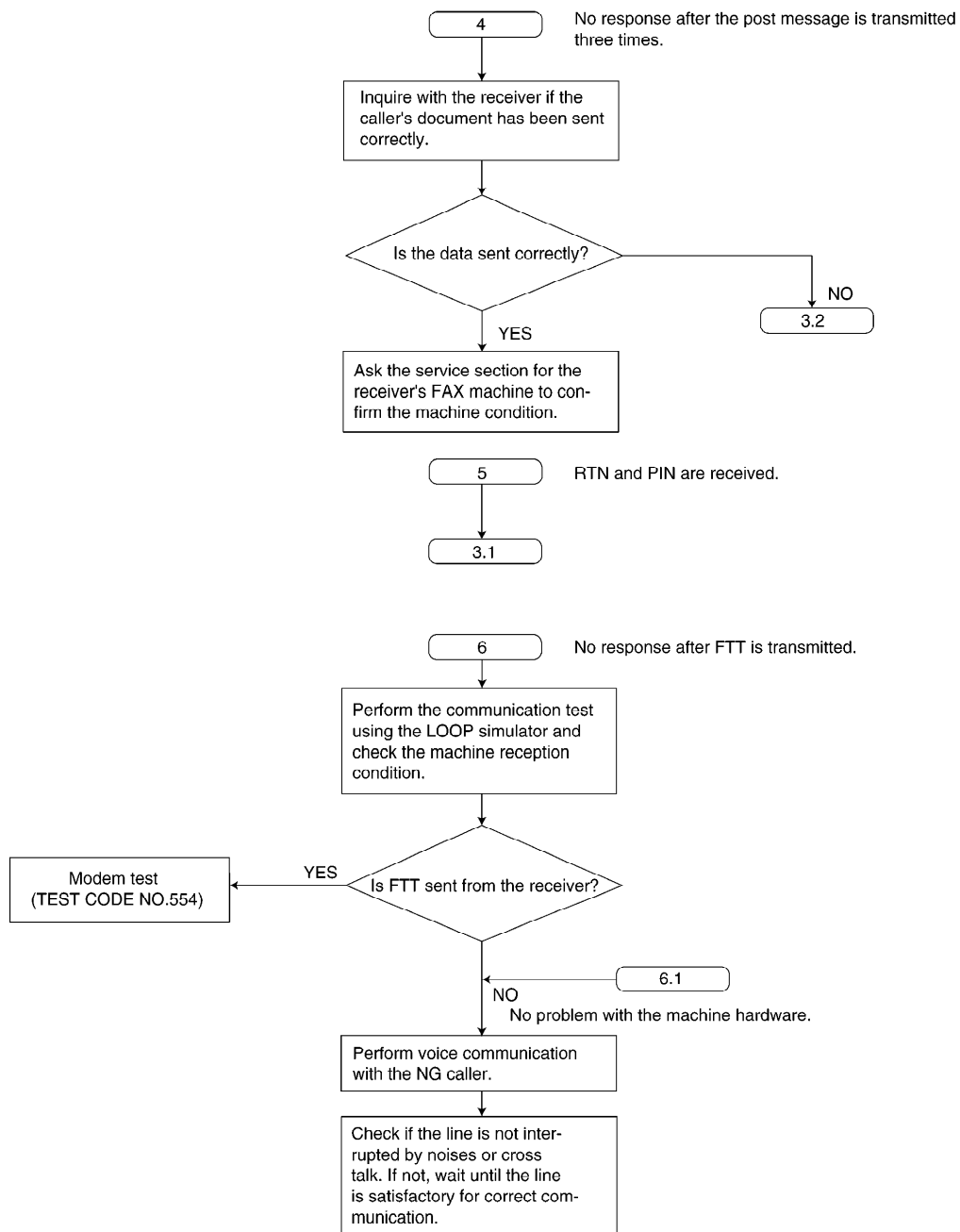
TRANS=TRANSMISSION RECEP=RECEPTION

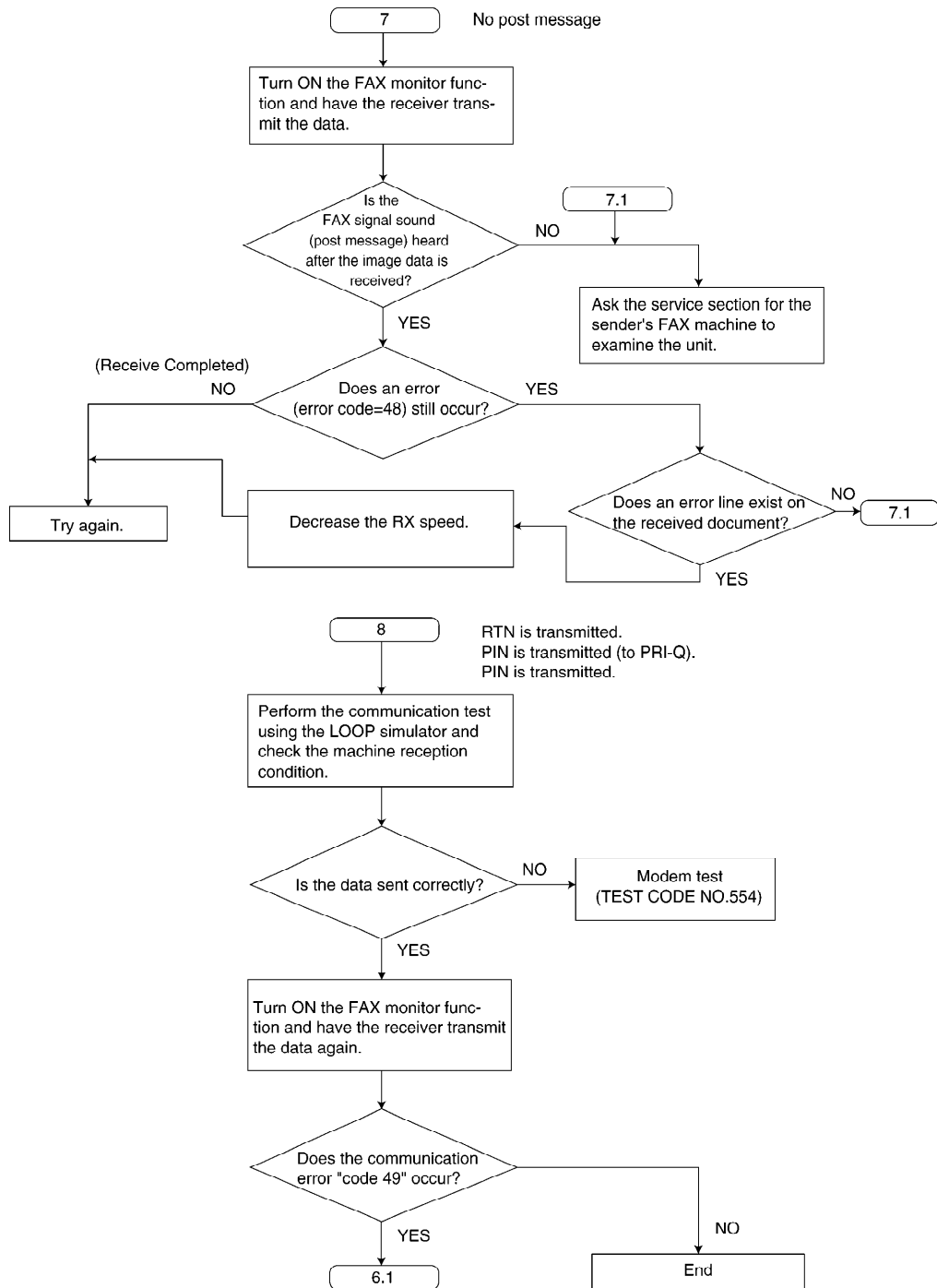
- a. Change the TX speed/RX speed. (Service code: 717/718, refer to **SERVICE FUNCTION TABLE** ().)
 - b. Change the transmit level. (Service code: 596, refer to **SERVICE FUNCTION TABLE** ().)
- If the problem remains, see the next page.

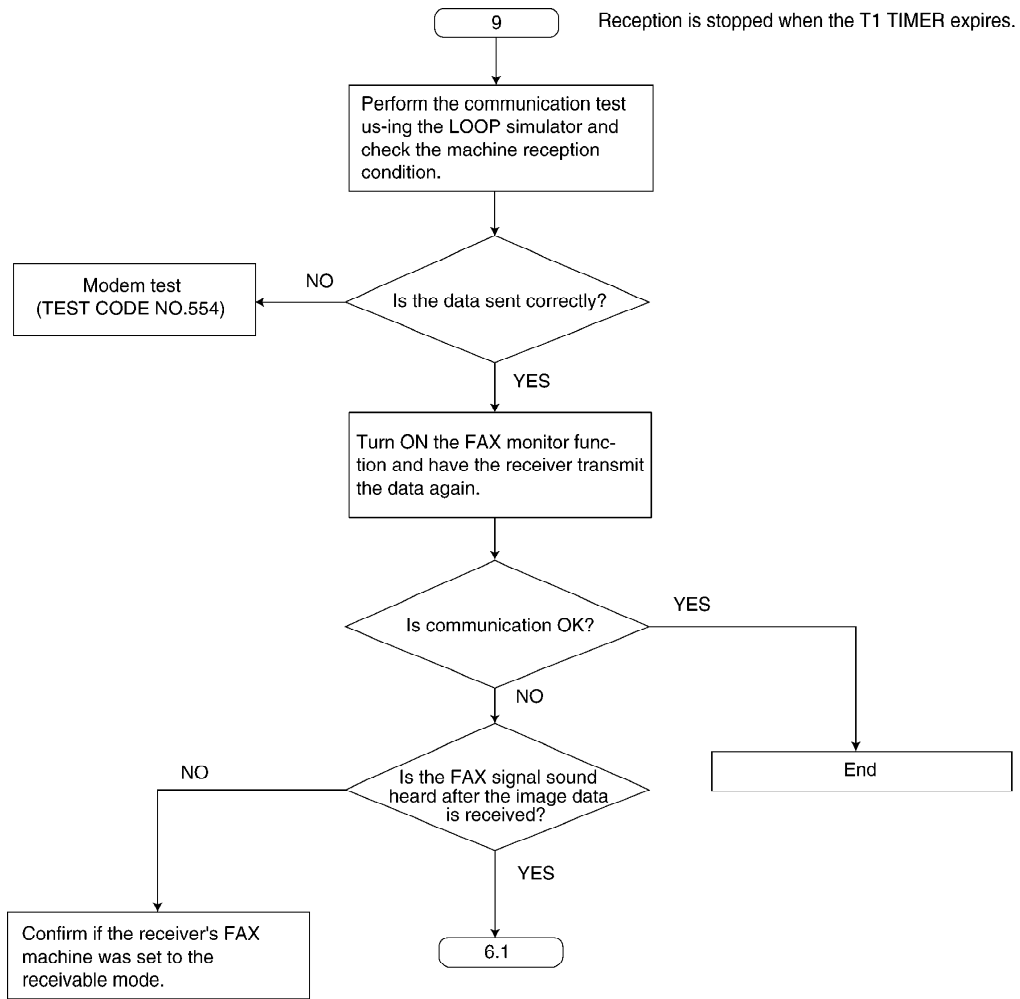
Countermeasure

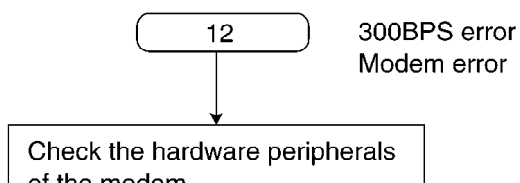
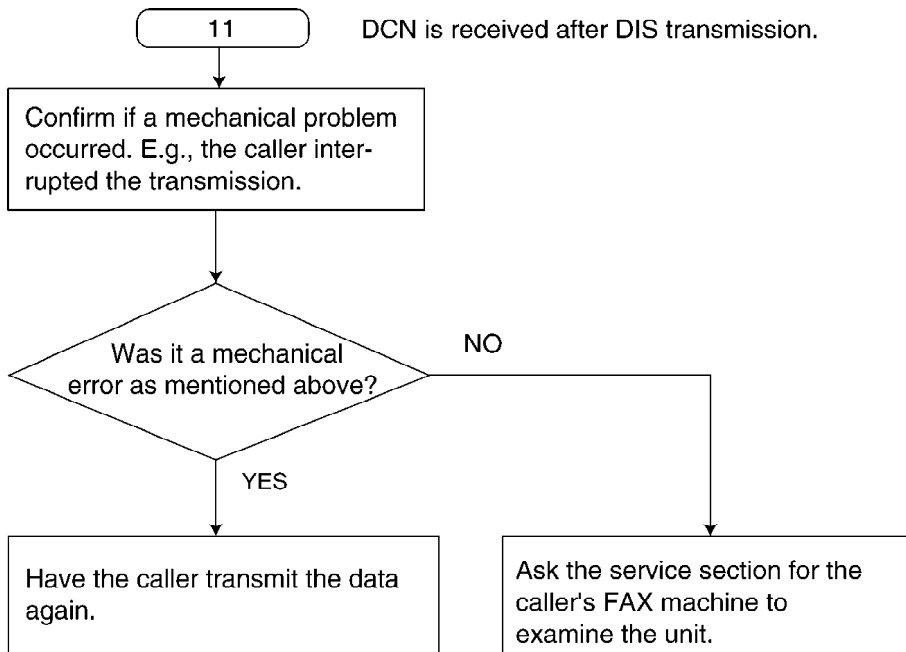
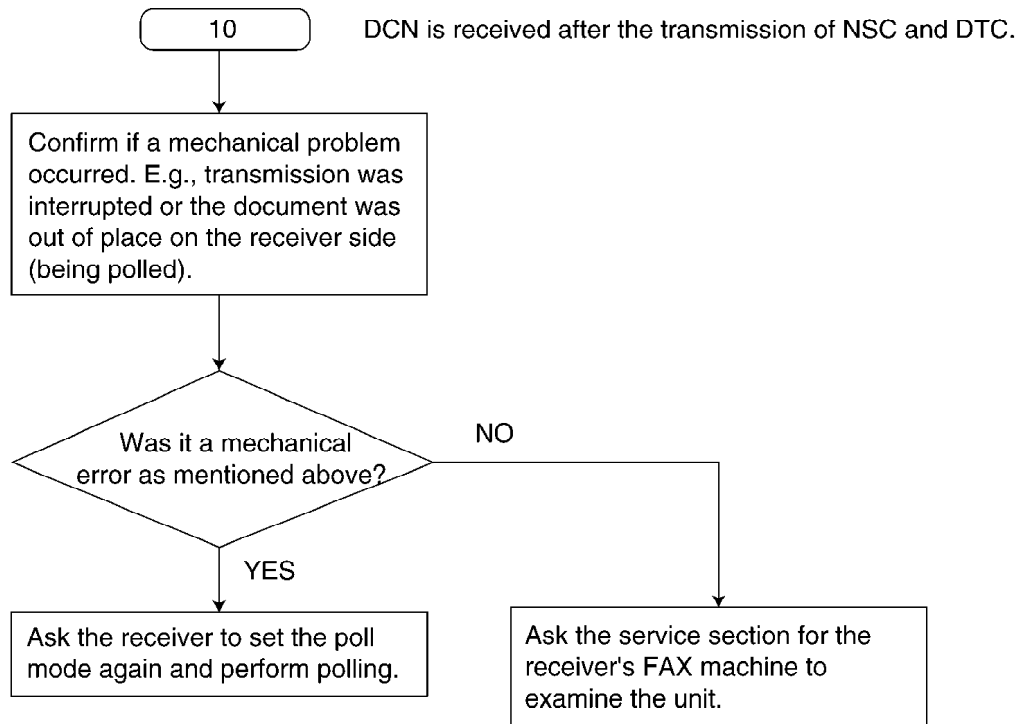




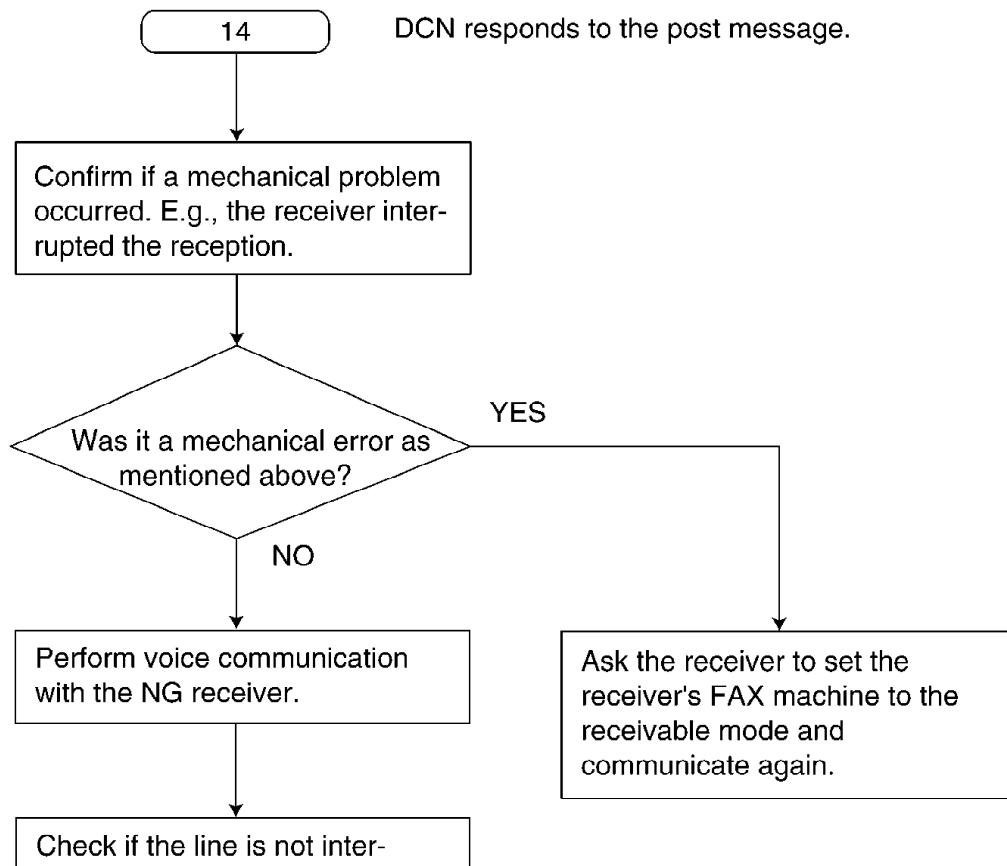
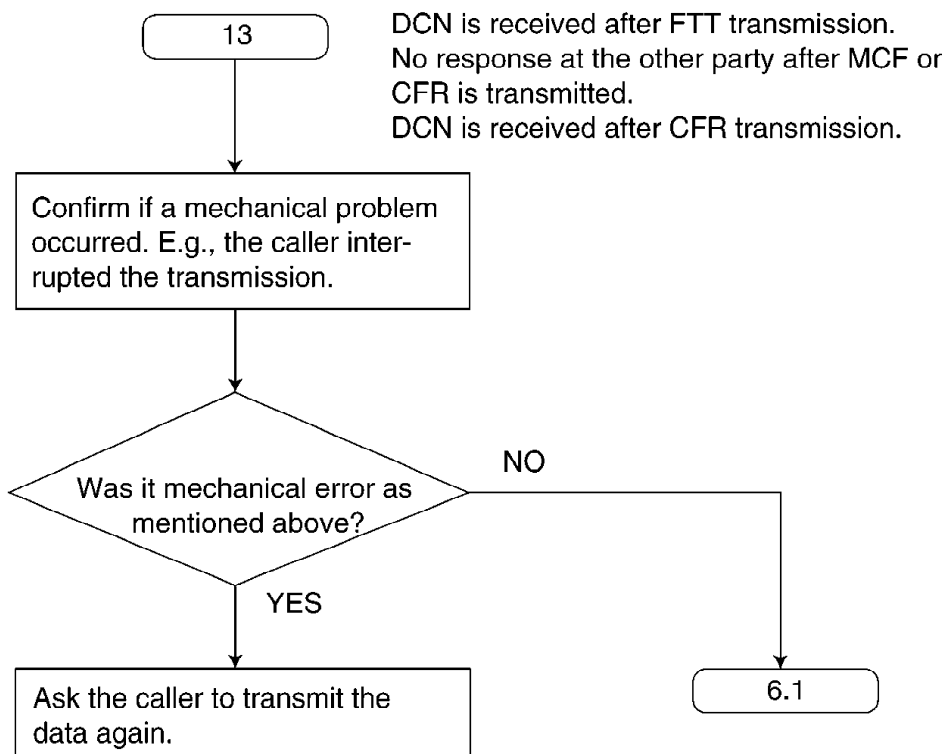


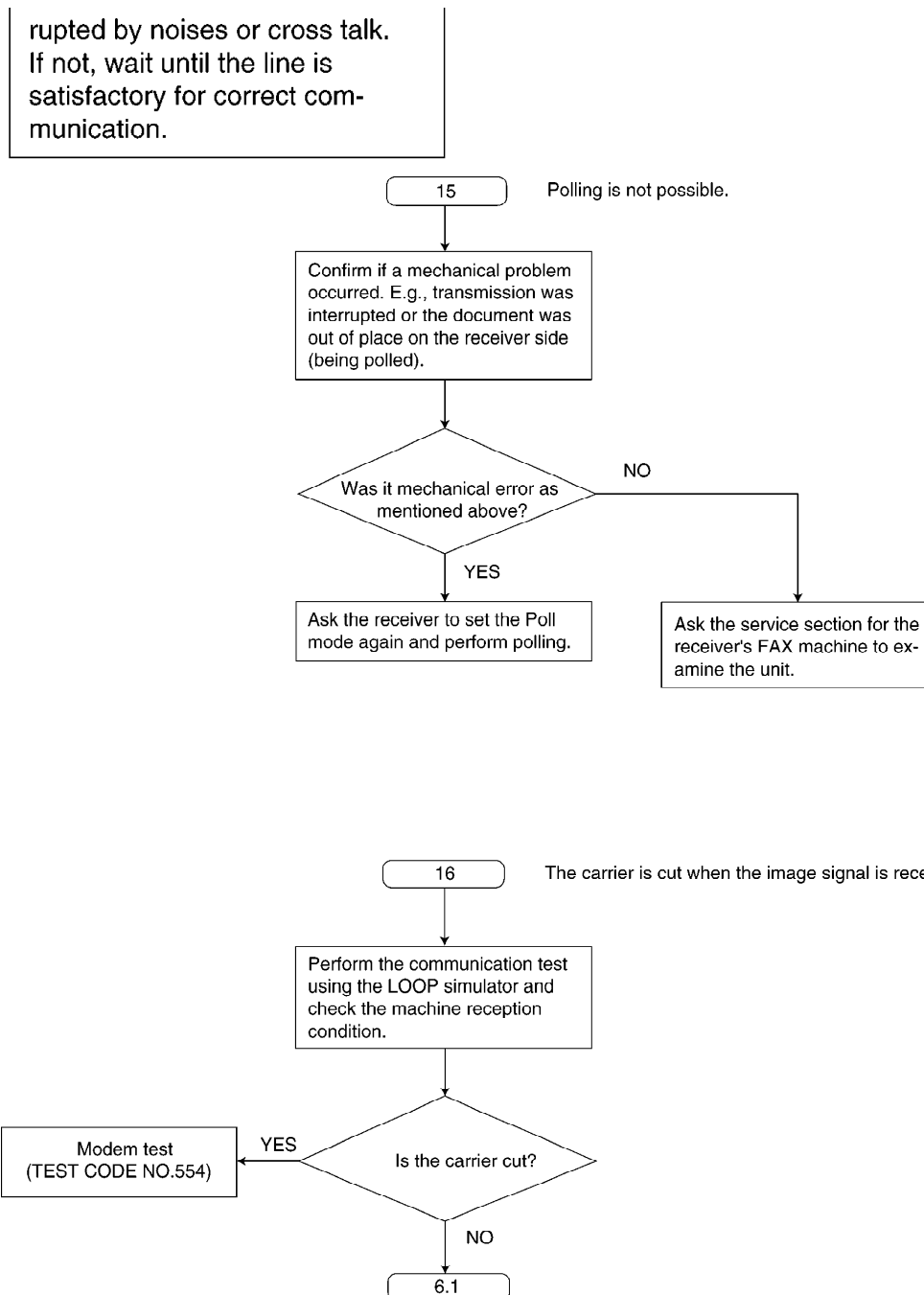






of the modem.





2.3.5.2. REMOTE PROGRAMMING

If, after the call is connected, the customer describes the situation and it is determined that the problem can be corrected by making parameter changes, this function makes it possible to change parameters such as the user code and service code from another fax (using DTMF tones). Therefore, travel to the customer's location is not required. However, it is not possible to change all the parameters remotely (Refer to **PROGRAM MODE TABLE ()**). The function used to accomplish this is remote programming.

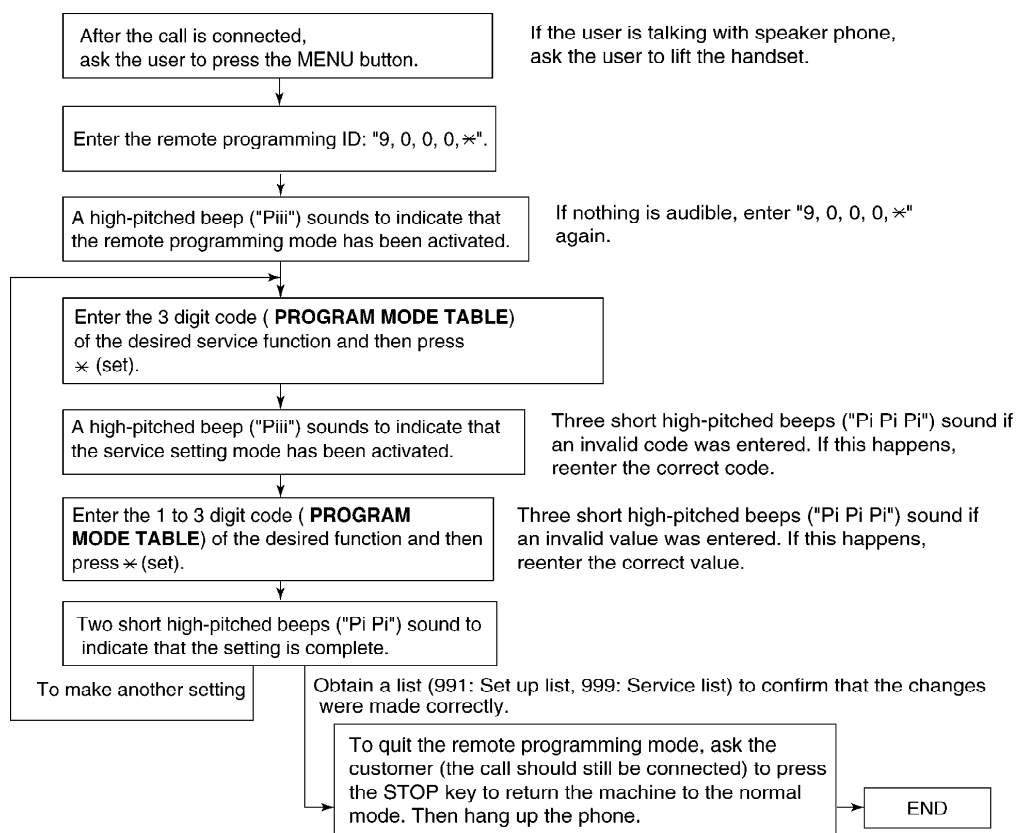
First, in order to check the current status of the service code parameter, out put the setup list (code: 991) and service list (code: 999) from the customer's fax machine. Based on this, the parameters for the desired codes can be changed. The procedure for changing and listing parameters is described on **ENTERING THE REMOTE PROGRAMMING MODE AND CHANGING**

SERVICE CODES (). Also, before exiting the remote programming mode, it is advisable to obtain a new list to confirm that only the desired parameters were changed.

Hint:

Since the connected telephone is in use during the remote programming mode, it may be helpful to ask the customer to switch to the speakerphone (except for a digital speakerphone). This frees the customer from the need to remain right next to the fax while you are making parameter settings. When finished, inform the customer. Also note that in very noisy locations where the DTMF tones are not audible, the remote programming function will not work.

2.3.5.2.1. ENTERING THE REMOTE PROGRAMMING MODE AND CHANGING SERVICE CODES



CROSS REFERENCE:

PROGRAM MODE TABLE ()

2.3.5.2.2. PROGRAM MODE TABLE

Code	Function	Set Value	Default	F
001	Set the date and time	dd/mm/yy hh:mm	-----	
002	Your logo	-----	-----	
003	Your telephone number	-----	-----	
004	Print transmission report	ERROR/ON/OFF	ERROR	
005	Auto receive mode	TAD/FAX/FAX ONLY/TEL/ FAX	TAD/FAX	
006	TAD/FAX ring count	1~4:TOLL SAVER/RINGER OFF	2	
007	FAX ring count	1 to 4 rings	2 ring	
009	TEL/FAX delayed ring	1 to 4 rings	2 ring	
010	Recording time	VOX/1 MIN	VOX	
011	Remote ANS ID	-----	ID=111	
013	Dialing mode	TONE/PULSE	TONE	
022	Journal auto print	1:ON 2:OFF	ON	
023	Overseas mode	1:ON 2:OFF	OFF	
025	Delayed send	1:ON 2:OFF	OFF	
026	Auto CALLER ID list	1:ON 2:OFF	ON	
030	Silent FAX recognition ring	3 to 9 rings	3 rings	
031	Ring detection	A/B/C/D/OFF	OFF	
039	LCD contrast	NORMAL/DARKER	NORMAL	
041	FAX activation code	1:ON 2:OFF	ON/ID=*9	
042	Message alert	1:ON 2:OFF	OFF	
043	REC. time alert	1:ON 2:OFF	OFF	
046	Friendly reception	1:ON 2:OFF	ON	
047	Voice guidance	1:ON 2:OFF	ON	
049	Auto disconnect	1:ON 2:OFF	ON/ID=*0	
054	Common greeting MSG. REC. time	16s/60s	16s	
058	Original setting	NORMAL/LIGHT/DARKER	NORMAL	
060	Message transfer	1:ON 2:OFF	OFF	
061	Transfer greeting	CHECK/RECORD/ERASE	CHECK	
067	ICM monitor	1:ON 2:OFF	ON	
070	FAX pager	1:ON 2:OFF	OFF	
076	Connecting tone	1:ON 2:OFF	ON	
080	Set the default	YES/NO	NO	
501	Pause time set	001~600 X 100 msec	050	
502	Flash time set	01~99 X 10 msec	74	
503	Dial speed set	1:10pps 2:20 pps	10	
510	Vox time	1:6sec 2:4sec	6sec	
520	CED frequency select	1:2100Hz 2:1100Hz	2100	
521	International mode select	1:ON 2:OFF	ON	
522	Auto standby select	1:ON 2:OFF	ON	
523	Receive equalizer select	1:0km 2:1.8km 3:3.6km 4: 7.2km	0km	

Code	Function	Set Value	Default	F
524	Transmission equalizer select	1:0km 2:1.8km 3:3.6km 4:7.2km	0km	
533	Setting the number of times that message transfer is redialled.	00~99	05	
534	Setting of the message transfer/pager call redial interval	001~999	065	
544	Document feed position adjustment value set	01~99 step	50	
550	Memory clear	Press "START".	-----	
551	ROM check	Press "START".	-----	
552	DTMFsignal tone test	1:ON 2:OFF	OFF	
553	Monitor on FAX communication select	1:OFF 2:P-B 3:ALL	OFF	
554	Modem test	Press "START".	-----	
555	Scanner test	Press "START".	-----	
556	Motor test	Press "START".	-----	
557	LED test	Press "START".	-----	
558	LCD test	Press "START".	-----	
559	Document jam detection select	1:ON 2:OFF	ON	
560	Cutter selection	1:ON 2:OFF	ON	
561	Key test	Press any key.	-----	
562	Cutter test	"START" push	-----	
570	Break % select	1:61% 2:67%	67%	
571	ITS auto redial time set	00~99	05	
572	ITS auto redial line disconnection time set	001~999 set	065	
573	Remote turn-on ring number set	01~99	10	
580	TAM continuous tone detection	1:ON/2:OFF	ON	
590	FAX auto redial time set	00~99	05	
591	FAX auto redial line disconnection time set	001~999	065	
592	CNG transmit select	1:OFF/2:ALL/3:AUTO	ALL	
593	Time between CED and 300 bps	1:75/2:500/3:1s	75 ms	
594	Overseas DIS detection select	1:1st/2:2nd	1st	
595	Receive error limit value set	001~999	100	
596	Transmit level set	21~00dBm	-07	
598	Receiving Sensitivity	20~48 dBm	-41	
717	Transmit speed select	1:9600/2:7200/3:4800/4:2400bps	9600bps	
718	Receive speed select	1:9600/2:7200/3:4800/4:2400bps	9600bps	
719	Ringer off in TEL/FAX mode	1:ON/2:OFF	ON	
721	Pause tone detect	1:ON/2:OFF	ON	
722	Redial tone detect	1:ON/2:OFF	ON	
731	CPC mode	1:A / 2:B / 3:OFF	A	
737	Prerent coect call	1:ON / 2:OFF	OFF	
763	Friendly reception CNG detection select	1:10S/2:20S/3:30S	20S	
771	T1 timer	1:35 sec/2:60 sec	35 sec	

Code	Function	Set Value	Default	F
774	T4 timer	00~99 X 100ms	00	
775	Monitoring of message transfer	1:ON/2:OFF	OFF	
815	Sensor check	Press "START".	-----	
841	Digital SP-Phone RX & TX check	1: SP-Phone	-----	
882	Journal 3	1: START	-----	
991	Transmit basic list	1: START	-----	
992	Transmit advanced list	1: START	-----	
994	Transmit journal report	1: START	-----	
999	Transmit service list	1: START	-----	

OK : Can set the value by the remote programming feature or print a list.

NG : Cannot set the value.

Note:

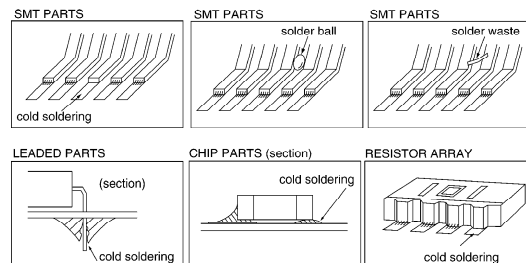
Note: Refer to **SERVICE FUNCTION TABLE** () for descriptions of the individual codes.

For example, the "004 Transmission report mode" set value "1:ERROR/2:ON/3:OFF" number corresponds to the number dialled.

2.3.6. DIGITAL BOARD SECTION

One of most difficult problems to deal with is when the system will not boot up.

The symptom: No response when the power is turned on. (No LCD display, keys are not accepted.)



Note:

1. Electrical continuity may have existed at the factory check, but a faulty contact occurred as a result of vibration, etc., during transport.
2. Solder waste remaining on the board may get caught under the IC during transport, causing a short circuit.

Before we begin mass production, several hundred trial units are produced at the plant, various tests are applied and any malfunctions are analyzed. (In past experiences, digital IC (especially SRAM and ROM) malfunctions are extremely rare after installation in the product.) / This may be

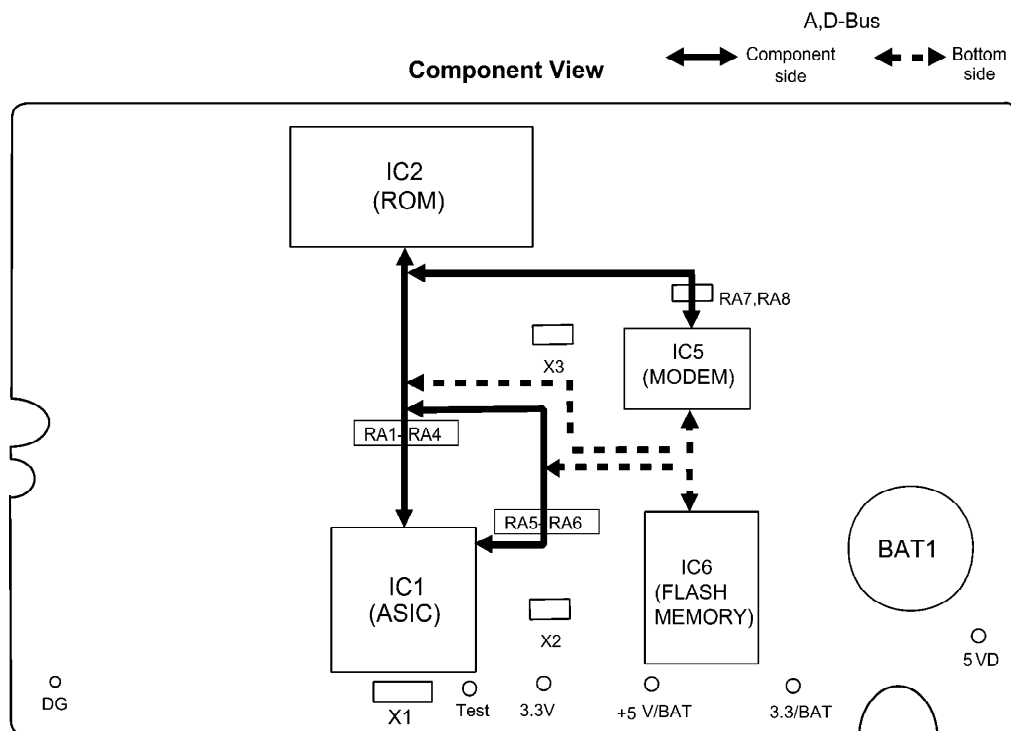
repaired by replacing the IC, (ASIC etc.). However, the real cause may not have been an IC malfunction but a soldering fault instead. / Soldering faults which are difficult to detect with the naked eye are common, particularly for an ASIC and RA (Resistor Array). But if you have an oscilloscope, you can easily determine the problem site or IC malfunction by checking the main signal lines. / Even if you don't have such a measuring instrument, by checking each main signal line and resoldering it, in many cases the problem will be resolved. / An explanation of the main signals (for booting up the unit) is below.

Don't exchange ICs or stop repairing until checking the signal lines.
An IC malfunction rarely occurs. (By understanding the necessary signals for booting up the unit, the "Not Boot up" display is not a serious problem.)

What are the main signals for booting up the unit?

Please refer to the **DIGITAL BLOCK DIAGRAM** (). / The ASIC (including the CPU) (IC1) controls all the other digital ICs. When the power is turned on, the ASIC (CPU) retrieves the operation code stored in the ROM (IC2), then follows the instructions for controlling each IC. All ICs have some inner registers that are assigned to a certain address. / It is the address bus by which the ASIC (CPU) designates the location inside each IC. And the data bus reads or writes the data in order to transmit the instructions from the ASIC (CPU) to the ICs. / These signal lines are all controlled by voltages of 5V/3.3V (H) or 0V (L).

2.3.6.1. DIGITAL BLOCK DIAGRAM



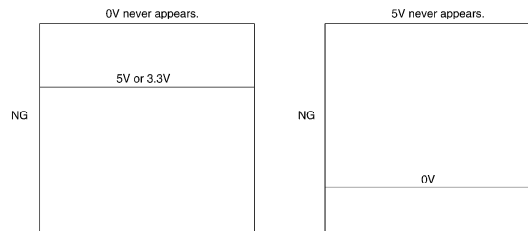
The signal lines that must be normal for the system to boot up are listed here [List 1]. / For signal lines other than these, even if they malfunction they do not directly affect booting up the system.

[List 1]

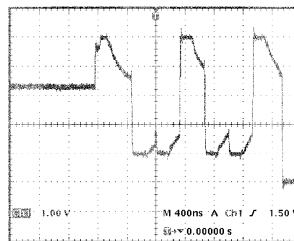
- | | | |
|-----|-------------------|-----------------------|
| (1) | D0~D7 | (Data Bus) |
| (2) | A0~A12, RBA0~RBA5 | (Address Bus) |
| (3) | RD | (Read Signal) |
| (4) | ROMCS | (ROM Select Signal) |
| (5) | WR | (Write Signal) |
| (6) | RAMCS | (SRAM Select Signal) |
| (7) | MDMCS | (MODEM Select Signal) |

If these signals are normal, once the power is turned on, each IC repeatedly outputs 5V or 3.3V (H) and 0V (L). The following page shows NG and normal wave patterns.

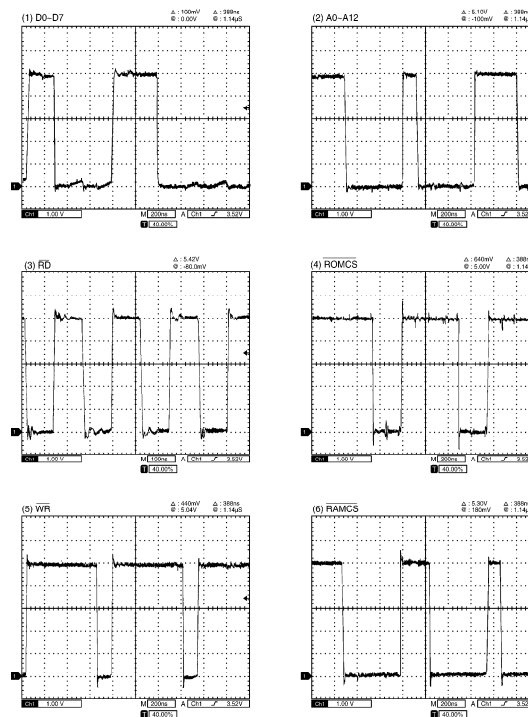
NG Wave pattern (Refer to NG EXAMPLE)

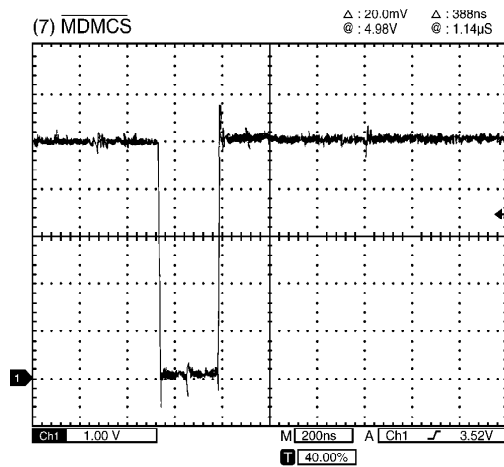


For a short between D0 and D1



Normal Wave Patterns

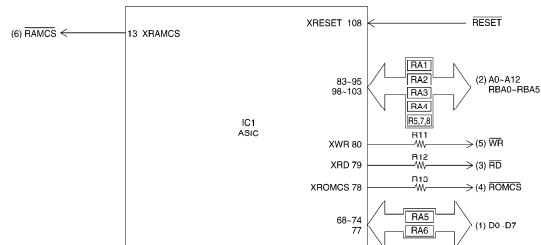


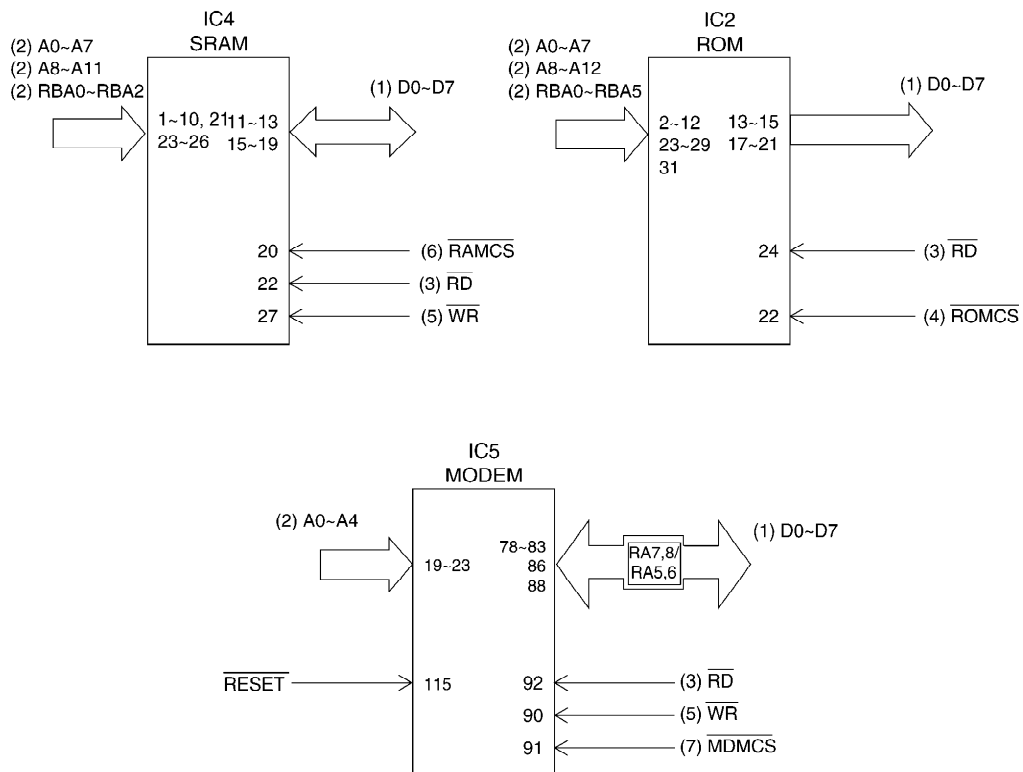


For these reasons and the software sequence to boot up the unit, if you use an oscilloscope to judge whether a signal is OK or NG, you must check in the same order as in [List 1]. (If the ASIC (CPU) failed to access the ROM, the ASIC cannot access the SRAM normally.) The digital circuit actually operates according to the timing combinations of these signals. So, if the timing of these signals is even slightly off, the circuit will not operate normally. Even of the IC did malfunction, the output voltage level may become abnormal but the timing is accurate according to the specifications. (If oscillation is provided accurately.) / Accordingly, the problem presented here is whether each IC outputs the correct signal. (See the I/O and Pin No. diagram.) In other words, is it constantly switching between 5V or 3.3V (H) and 0V (L) as described earlier.

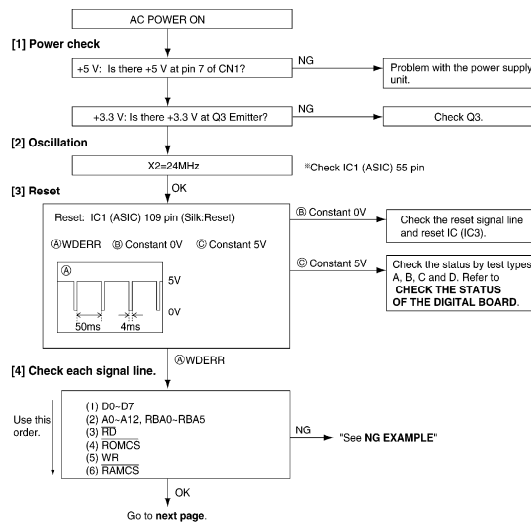
All you have to do is check that the IC repeatedly outputs (H) 5V or 3.3V and (L) 0V.

I/O and Pin No. Diagram





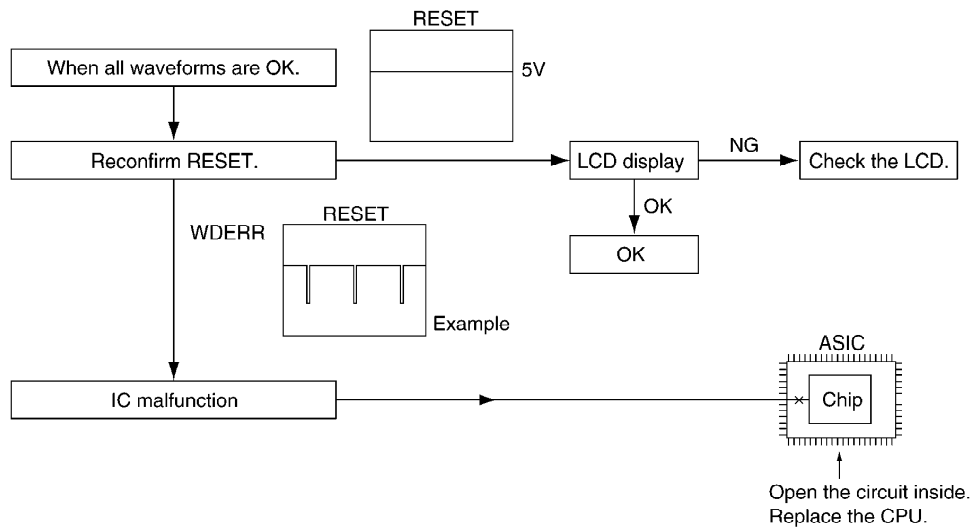
After the power is turned on, the ASIC (CPU) initializes and checks each IC. The ROM, SRAM, and Modem are checked. If initialization fails for the ICs, the system will not boot up.



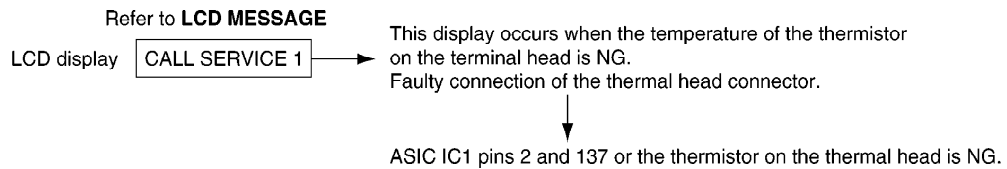
CROSS REFERENCE:

NG EXAMPLE ()

CHECK THE STATUS OF THE DIGITAL BOARD ()



Other NG examples while the power is ON and the LCD displays the following.

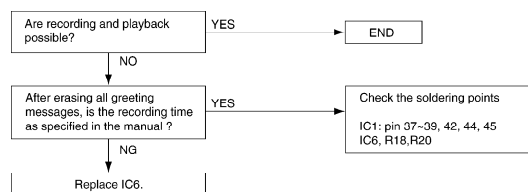


CROSS REFERENCE:

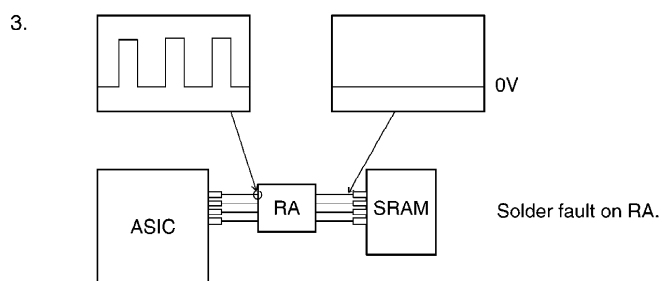
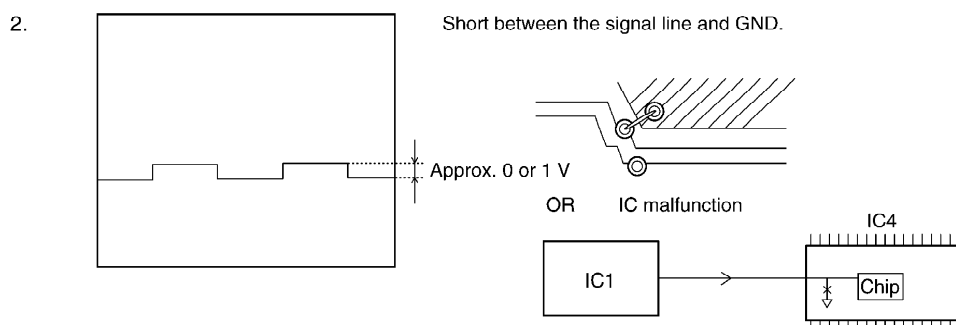
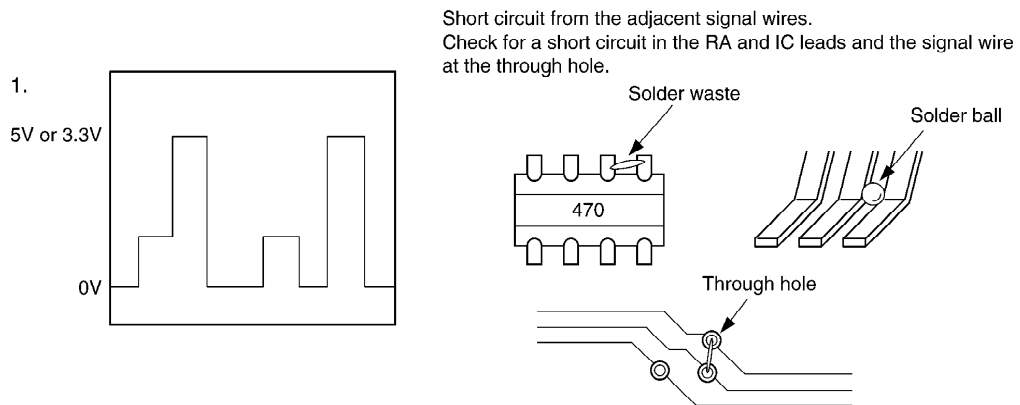
LCD MESSAGE ()

2.3.6.2. FLASH MEMORY (IC6)

If the unit is working correctly but the TAM function can not work, you should check the Flash Memory.

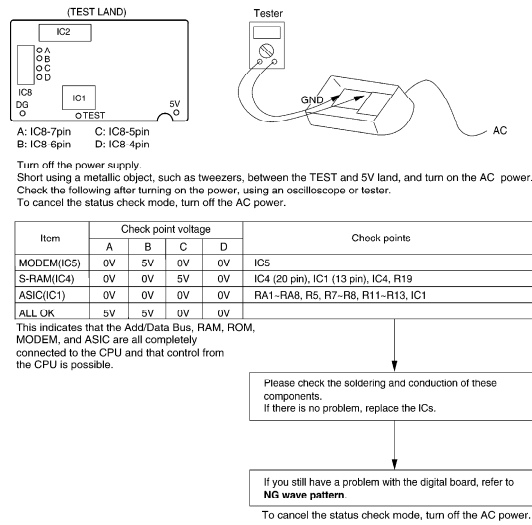


2.3.6.3. NG EXAMPLE



2.3.6.4. CHECK THE STATUS OF THE DIGITAL BOARD

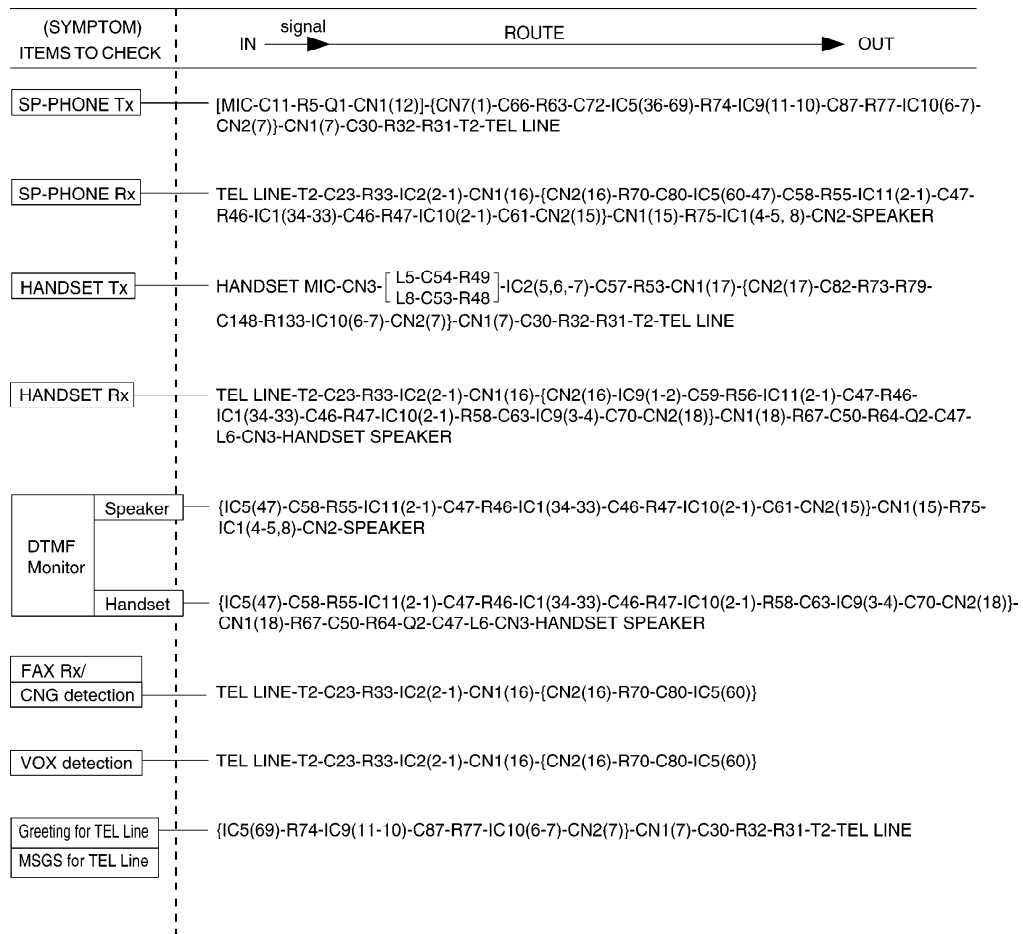
**Put the unit in the test mode and check the voltage at lands A, B, C and D.
Disconnect CN3 connector, during the test.**



2.3.7. ANALOG BOARD SECTION

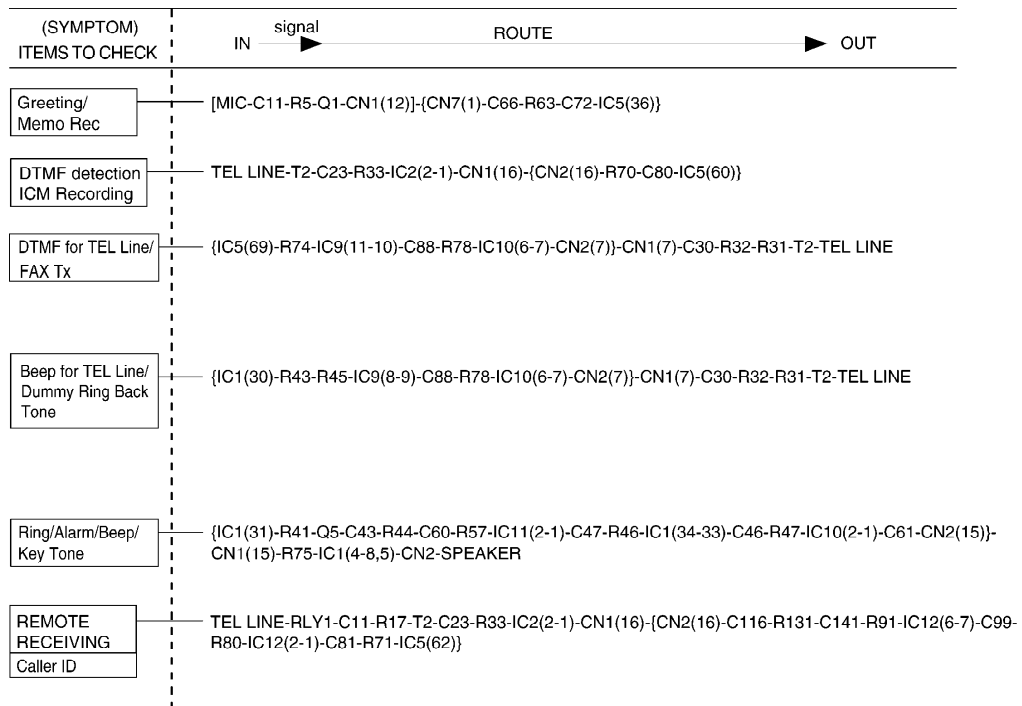
The analog parts check is actually different from the digital parts check. The signal route is determined by the purpose of the check. For example, the handset TX route begins from the handset microphone and is output in the telephone line. In this route, it is mainly an analog signal. Tracing the signal can be done easily using an oscilloscope. Each route is shown on the **CHECK SHEET** ()here. If there is a problem with the unit (for example, you cannot communicate with the H/S, etc.), trace the signal in the area and determine the cause.

2.3.7.1. CHECK SHEET



Note:

{ }: Inside the digital board / **[]:** Inside the operation board



Note:

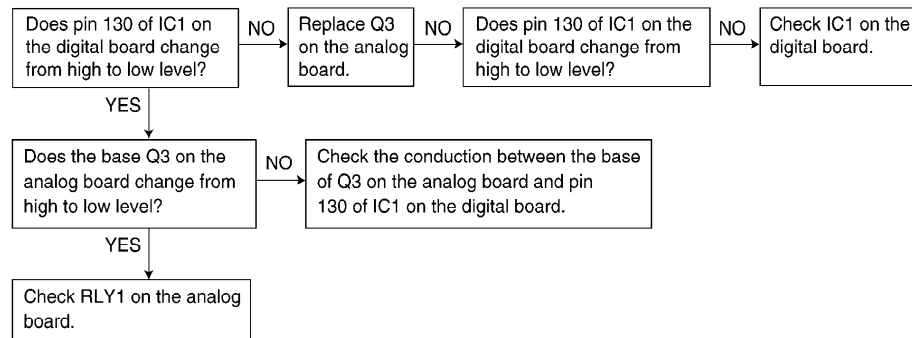
{ }: Inside the digital board / **[]:** Inside the operation board

2.3.7.2. DEFECTIVE ITS (INTEGRATED TELEPHONE SYSTEM) SECTION

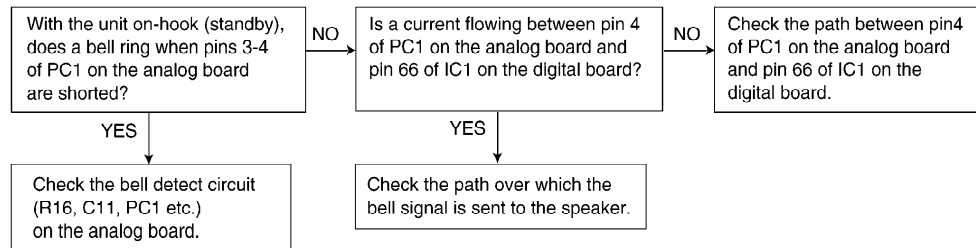
a. No handset and monitor transmission/reception

Following the ITS section or NCU section, search for the route between the microphone and the telephone line (sending) or between the telephone line and the speaker (receiving) where the signal disappears. Check the components at that point.

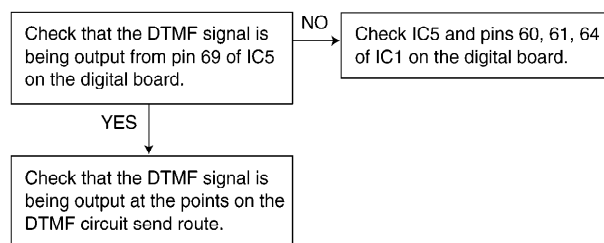
b. No pulse dialling



c. Not ring tone



d. No tone dialling



2.3.8. DIGITAL SPEAKERPHONE

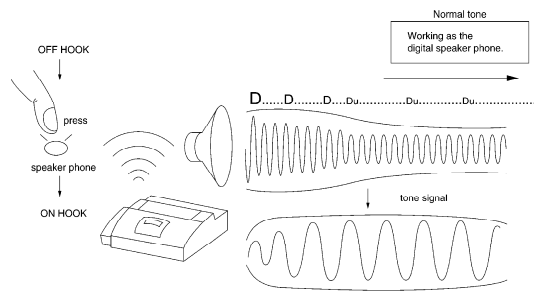
The digital speakerphone has different features from the analog speakerphone.

The analog speakerphone switches between Tx or Rx. Either Tx or Rx is able to pass through a telephone line or speaker, depending on the Tx and Rx signal (voice) level. The higher-level signal (either TX or RX) can pass through the route.

Therefore, you never hear the other party's voice while you are talking. However, the digital speakerphone allows you to hear the other party's voice while you are talking. So both Tx and Rx are active at the same time. There is also a difference in the troubleshooting procedures between the two types.

At the start of communication, during the initial 2~3 correspondences, the digital speakerphone performs half-duplex operation, alternating between transmission (Tx) and reception (Rx). Then duplex communication becomes available.

Learning occurs during the initial 2~3 correspondences in order to set the appropriate parameters for duplex communication.

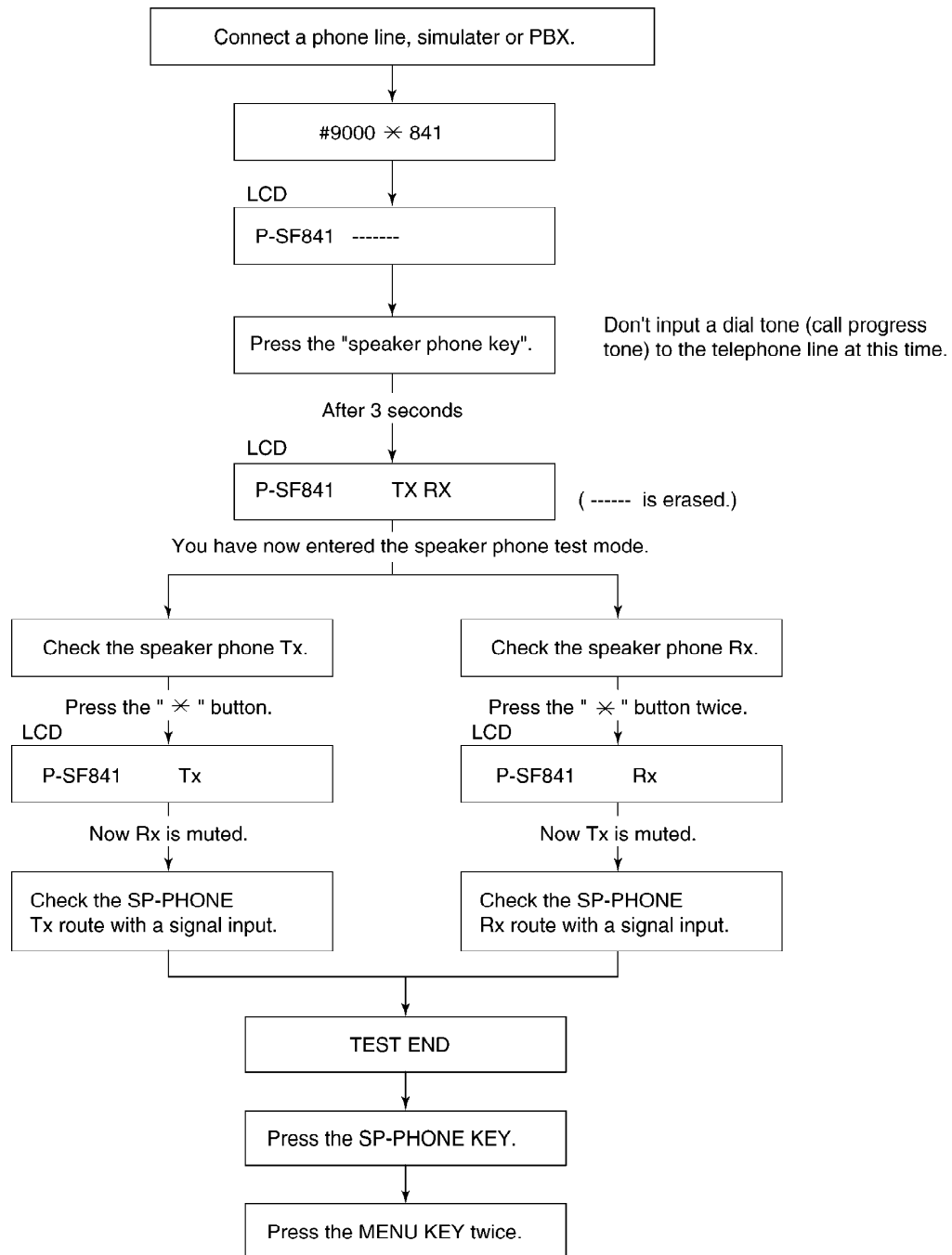


You cannot check the digital speaker phone by the signal route test mentioned in the Analog Board Section because the level is always changing as stated above.

Therefore, there is a service function for this troubleshooting. In this service mode, you can set the mute to either Tx or Rx. Then you can check the signal route of the speaker phone Tx or the speaker phone Rx without any disturbances.

HOW TO USE THE **841** SERVICE FUNCTION for THE DIGITAL SPEAKER PHONE

Please check by using the service function #9000 ✕ 841.



Refer to **ANALOG BOARD SECTION ()**.

2.3.9. POWER SUPPLY BOARD SECTION

1. Key components for troubleshooting

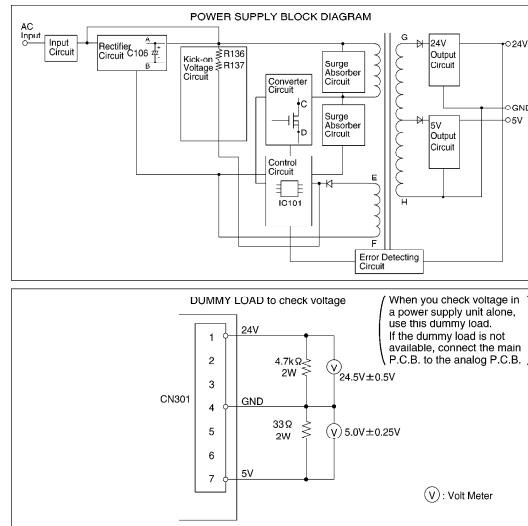
Check the following parts first: F101, D101-D104, C106, Q101, PC101 and IC101.

This comes from our experience with experimental tests. For example: power supply and lightning surge voltage test, withstanding voltage test, intentional short circuit test, etc.

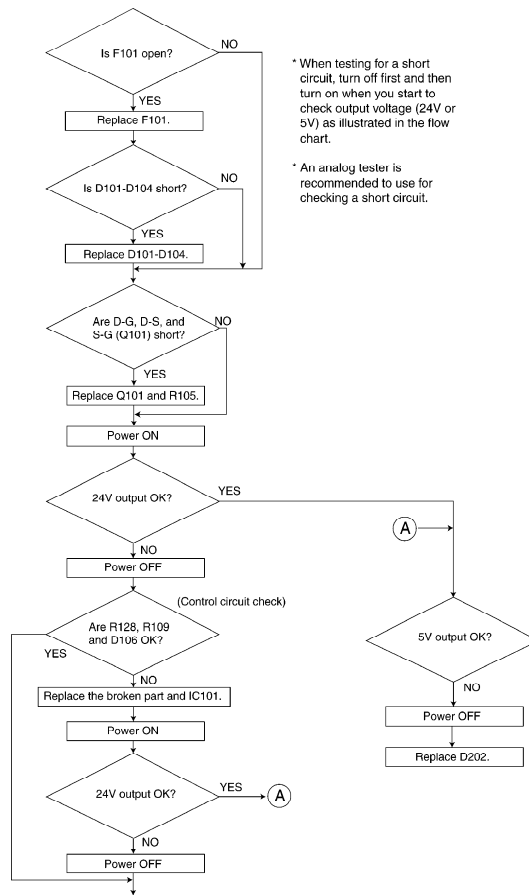
Caution:

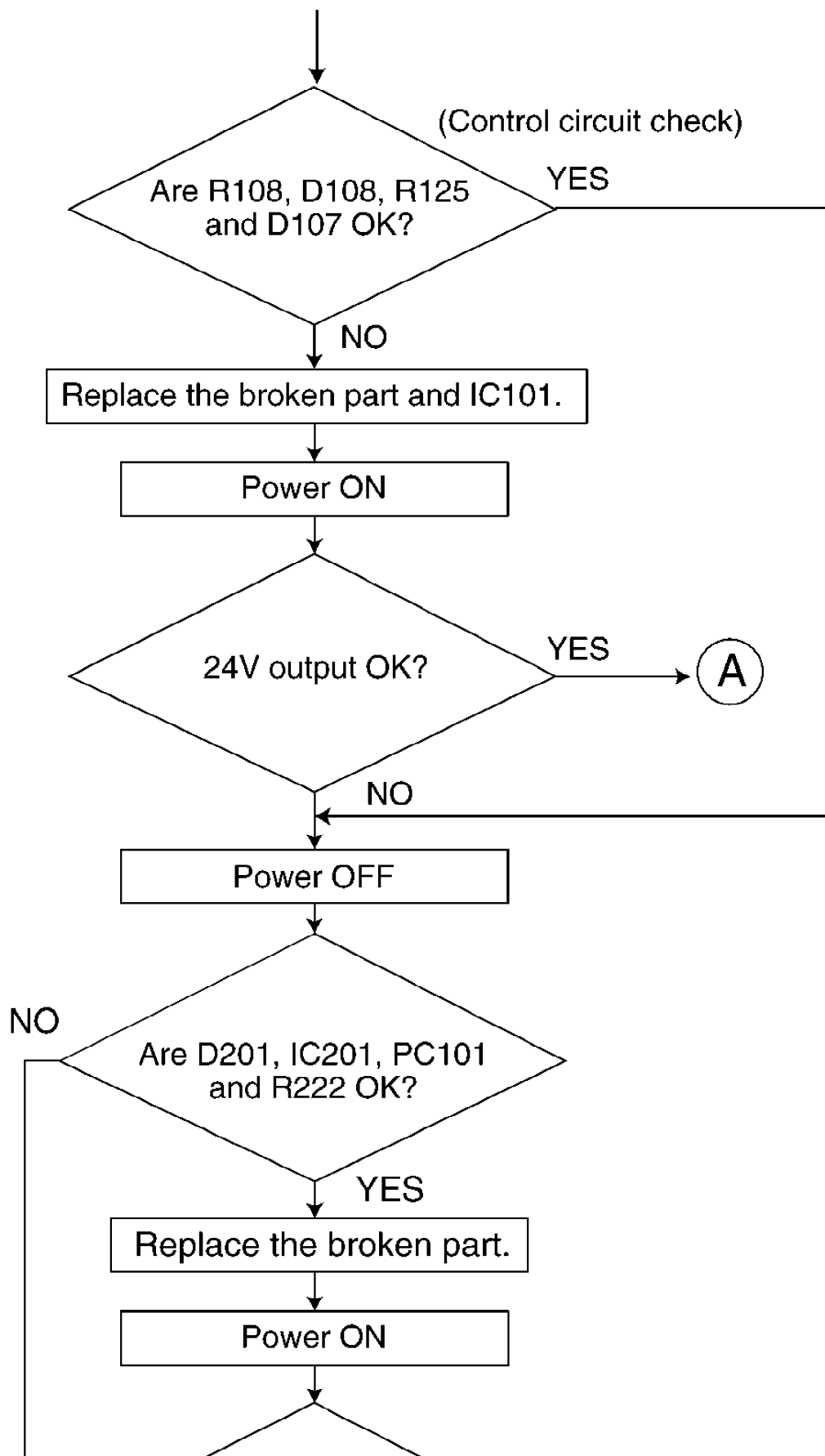
If you find a melted fuse in the unit, do not turn on the power until you locate and repair the faulty parts (except for the fuse); otherwise the fuse will melt again and you cannot pinpoint the faulty point.

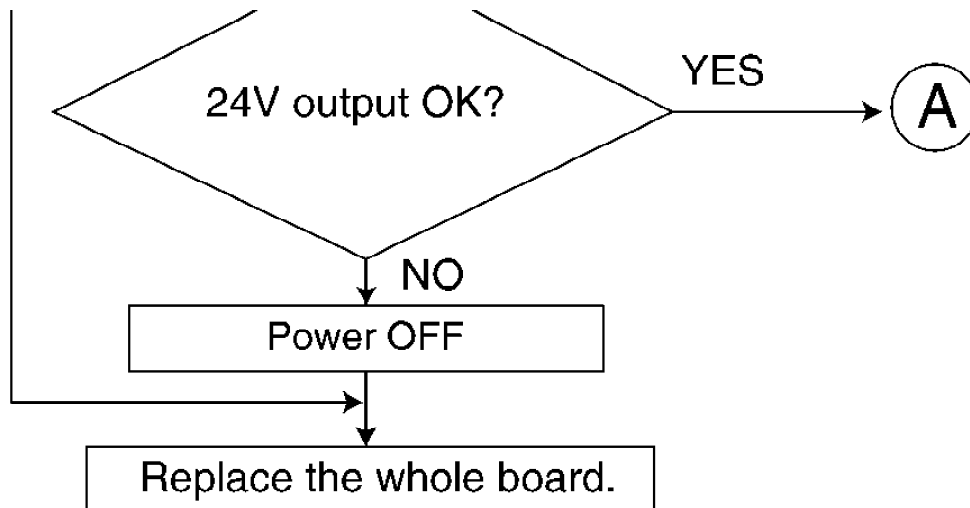
In most cases, the symptom is that nothing is output. It is more likely that the fault is in the primary side rather than the secondary side. Check the primary side first.



2. Troubleshooting Flow Chart







3. Broken parts repair details

(D101, D102, D103, D104)

Check for a short-circuit in terminal 4. If D101, D102, D103 and D104 are short-circuits, F101 will melt (open).

In this case, replace all of the parts (D101, D102, D103, D104, F101).

(Q101)

The worst case of Q101 is a short-circuit between the Drain and Gate because damage expands to the peripheral circuit of Q101.

This is due to a very high voltage through the Gate circuit which is composed of R128, R109, D106 and IC101.

You should change all of the parts listed as follows.

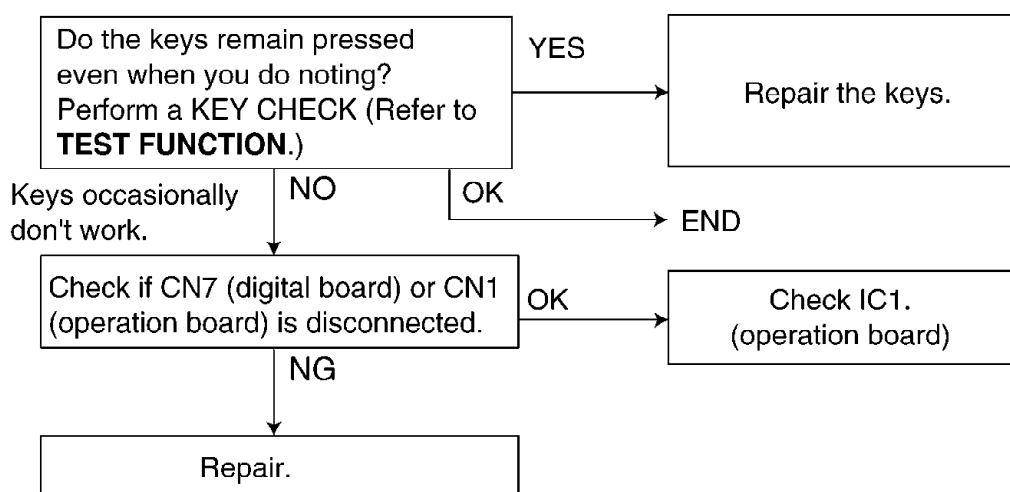
F101, Q101, R128, R109, D106, IC101

(D201)

If D201 is broken, the oscillation circuit in the power supply cannot operate. Check it with an electric tester.

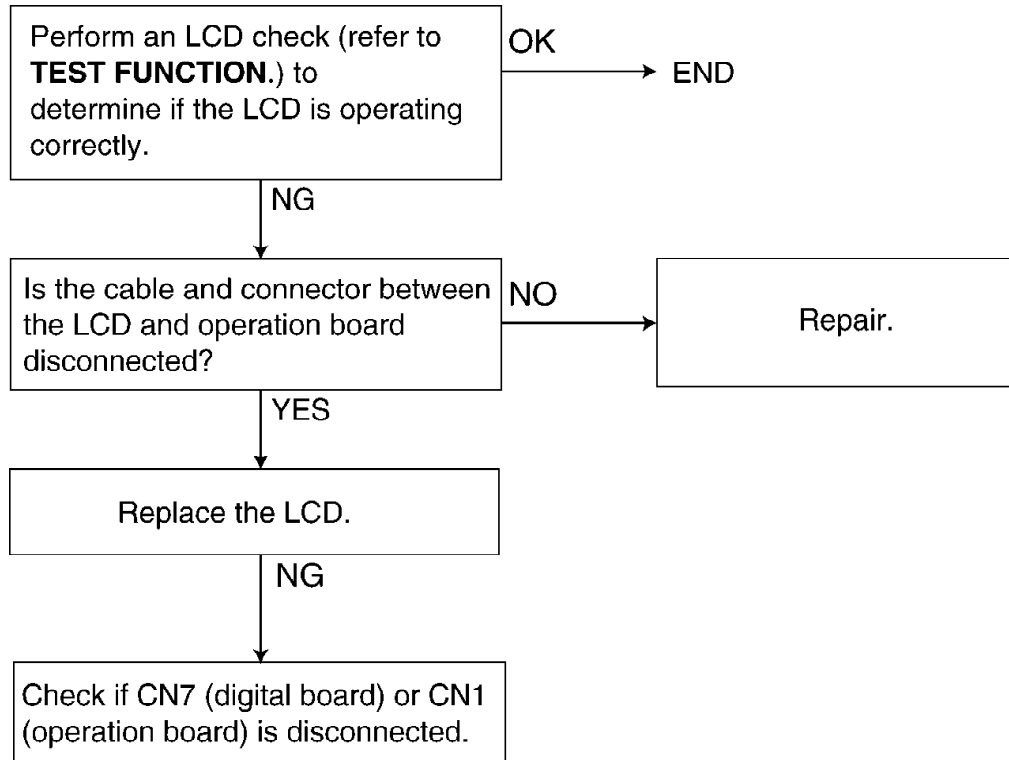
2.3.10. OPERATION BOARD SECTION

2.3.10.1. NO KEY OPERATION



CROSS REFERENCE:
TEST FUNCTIONS ()

2.3.10.2. NO LCD INDICATION

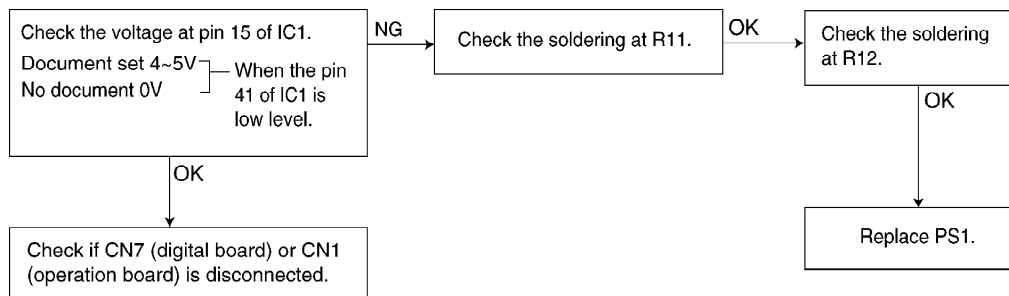


CROSS REFERENCE:
TEST FUNCTIONS ()

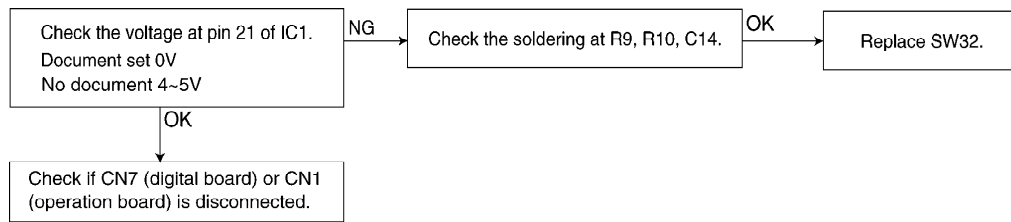
2.3.11. SENSOR SECTION

Refer to **6.5. SENSORS AND SWITCHES** for the circuit descriptions.
 Refer to **LCD MESSAGE ()**

2.3.11.1. CHECK THE DOCUMENT SENSOR (PS1)....."CHECK DOCUMENT" /

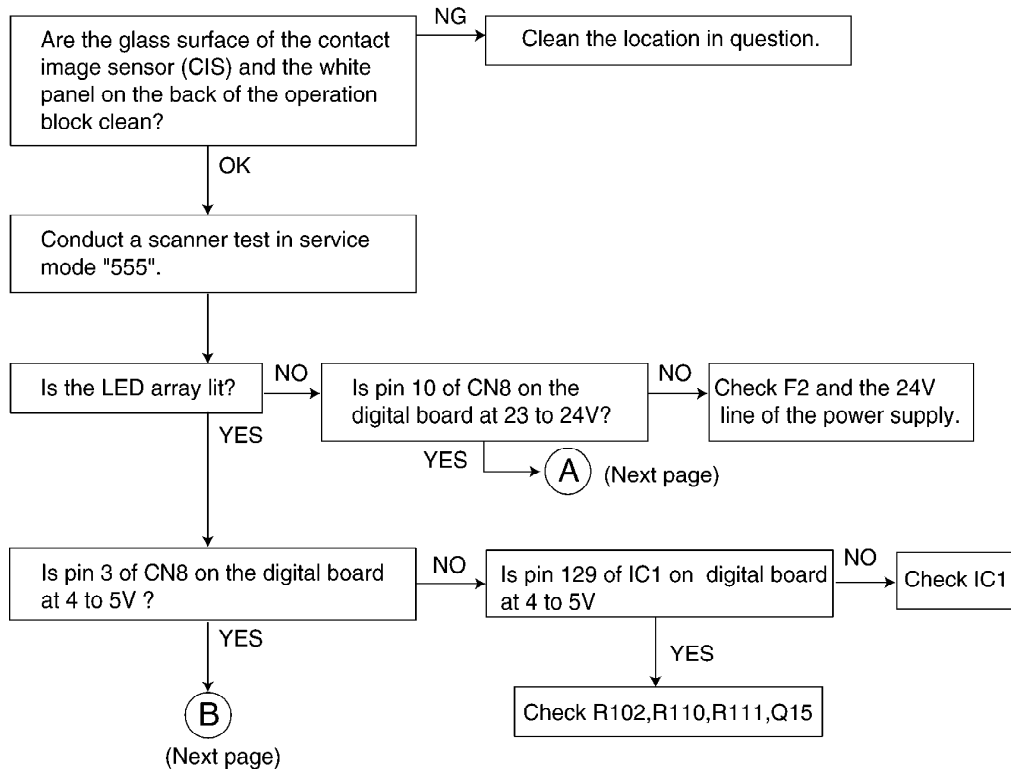


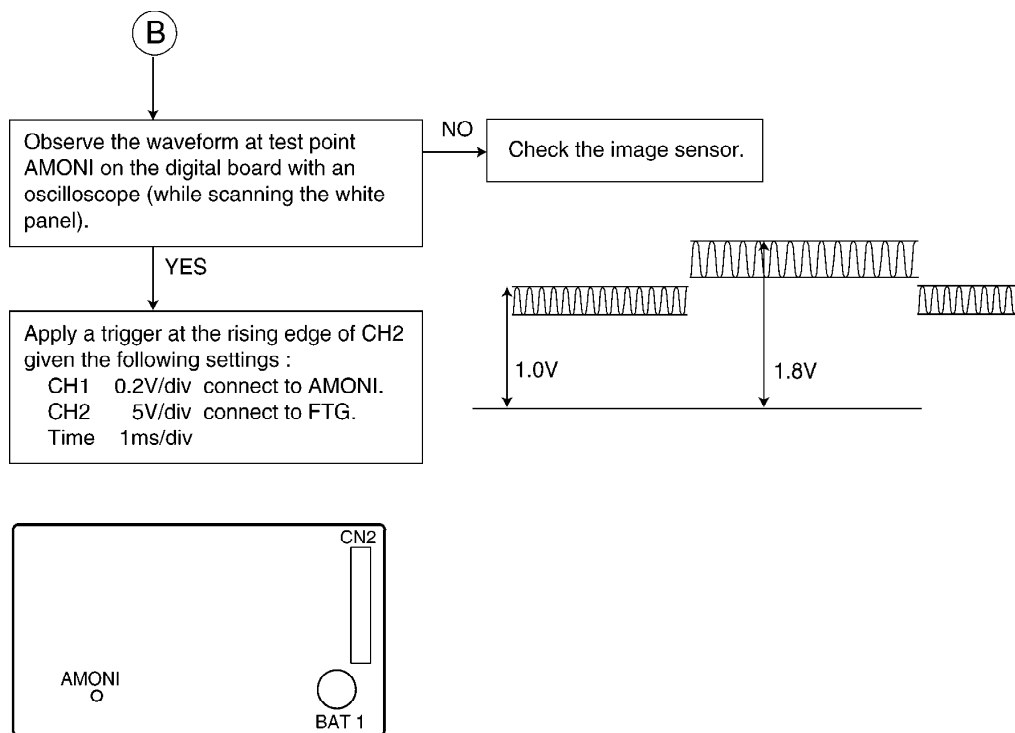
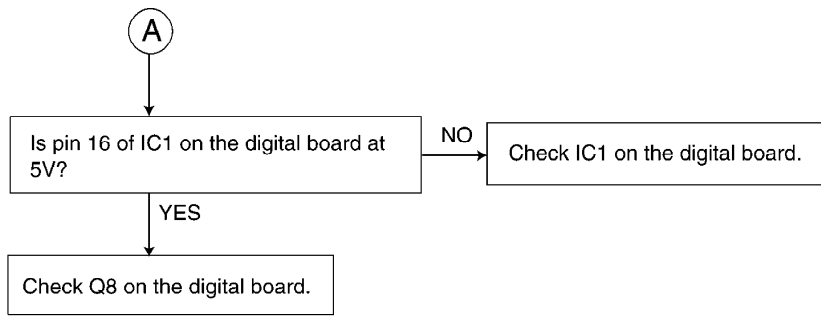
2.3.11.2. CHECK THE READ POSITION (SW32)....."REMOVE DOCUMENT" /



2.3.12. READ SECTION

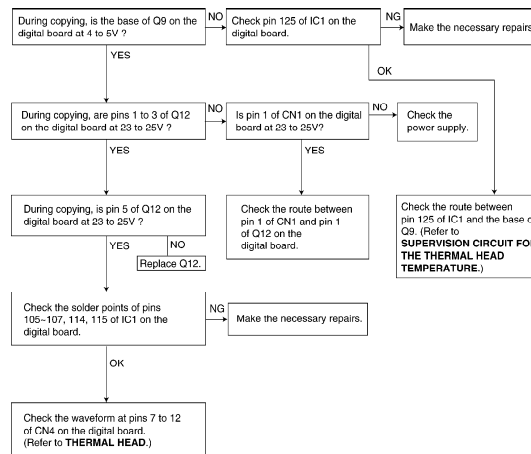
Refer to **SCANNING BLOCK ()**.





2.3.13. THERMAL HEAD SECTION

Refer to **THERMAL HEAD** ().



CROSS REFERENCE:

SUPERVISION CIRCUIT FOR THE THERMAL HEAD TEMPERATURE ()
THERMAL HEAD ()

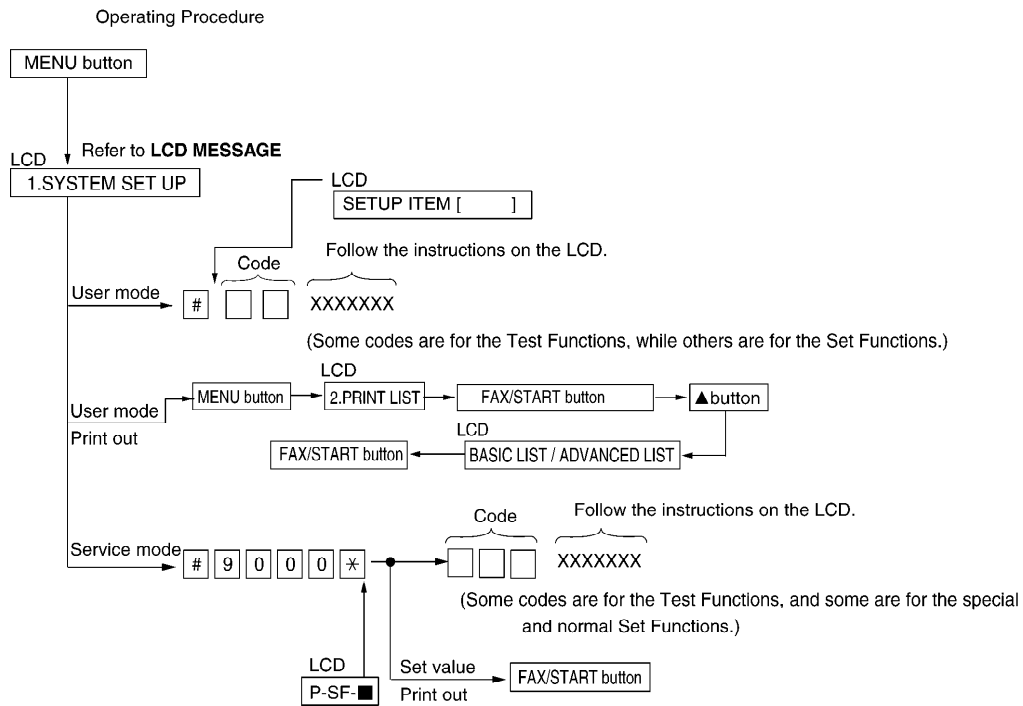
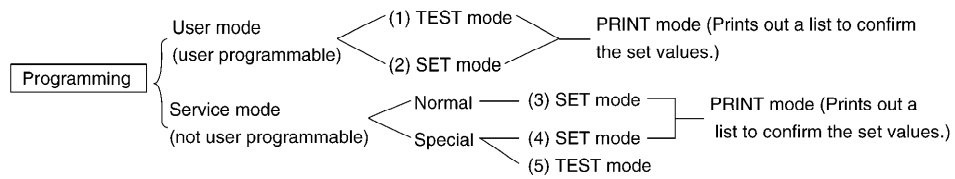
2.4. PROGRAMMING AND LISTS

The programming functions are used to program the various features and functions of the machine, and to test the machine. / Programming can be done in both the on-hook and off-hook conditions. This facilitates communication between the user and the service while programming the machine.

2.4.1. OPERATION

There are 2 basic categories of programming functions, the User Mode and the Service Mode. The Service Mode is further broken down into the normal and special programs. The normal programs are those listed in the Operating Instructions and are available to the user. The special programs are only those listed here and not displayed to the user. In both the User and Service Modes, there are Set Functions and Test Functions. The Set Functions are used to program various features and functions, and the Test Functions are used to test the various functions. / The Set Functions are accessed by entering their code, changing the appropriate value, then pressing the SET key. / The Test Functions are accessed by entering their code and pressing the key listed on the menu. While programming, to cancel any entry, press the STOP key.

2.4.2. OPERATION FLOW



CROSS REFERENCE:

LCD MESSAGE ()

2.4.3. USER MODE (The list below is an example of the SYSTEM SETUP LIST the unit prints out.)

【 FUNÇÕES BÁSICAS 】

NO.	FUNÇÃO	PROGRAMAÇÃO VIGENTE
#01	HORA E DATA	05 JAN. 2002 03:29
#02	SEU LOGOTIPO	
#03	SEU NÚMERO DE FAX	
#04	IMPRIME RELATÓRIO DE TRANSMISSÃO	ERRO [ERRO,LIGADO,DESL.]
#05	MODO DE ATENDIMENTO AUTOMÁTICO	SEC/FAX [TAD/FAX,FAX,TEL/FAX]
#06	CONTADOR DE TOQUES TAD/FAX	2 [1...4,POUPA LIG.,RING DESL.]
#07	CONTADOR DE TOQUES FAX	2 [1...4]
#09	ATRASO DE RINGUE TEL/FAX	2 [1...4]
#10	TEMPO DE GRAVAÇÃO	VOZ [VOZ,1 MIN]
#11	CÓDIGO DE ACESSO À DISTÂNCIA	
#13	MODO / DISCAGEM	CÓDIGO = 111 TOM [TOM,PULSO]

Code

Set Value

【 FUNÇÕES AVANÇADAS 】

NO.	FUNÇÃO	PROGRAMAÇÃO VIGENTE
#22	IMPRESSÃO DE RELATÓRIO	LIGADO [LIGADO,DESL.]
#23	TRANSMISSÃO A LONGA DISTÂNCIA	DESL. [LIGADO,DESL.]
#25	TRANSMISSÃO PROGRAMADA	DESL. [LIGADO,DESL.]
	DESTINO =	
	INÍCIO = 00:00	
#26	LISTA AUTO. CHAM. IDENTIFICADAS	LIGADO [LIGADO,DESL.]
#30	RECEPÇÃO SILENCIOSA	3 [3...9]
#31	DETECÇÃO DE TIPO DE RINGUE	DESL. [A,B,C,D,DESL.]
#39	CONTRASTE DO VISOR	NORMAL [NORMAL,ESCURO]
#41	CÓDIGO DE ATIVAÇÃO À DISTÂNCIA-FAX	LIGADO [LIGADO,DESL.]
	CÓDIGO = *9	
#42	ALERTA DE MENSAGEM	DESL. [LIGADO,DESL.]
#43	ALERTA DE TEMPO DE GRAVAÇÃO	DESL. [LIGADO,DESL.]
#46	RECEPÇÃO AMIGÁVEL	LIGADO [LIGADO,DESL.]
#47	GUIA DE VOZ	LIGADO [LIGADO,DESL.]
NOTA : QUANDO ESTA FUNÇÃO FOR DESLIGADA SEM QUE A MENSAGEM DE TRANSFERÊNCIA TENHA SIDO GRAVADA, A MENSAGEM DE TRANSFERÊNCIA SERÁ DESATIVADA (#60).		
#49	AUTO DESCONEXÃO	LIGADO [LIGADO,DESL.]
	CÓDIGO = *0	
#54	TEMPO DA MENSAGEM DE SAUDAÇÃO	16s [16s,60s]
NOTA : QUANDO SE AJUSTA O TEMPO DA MENSAGEM DE SAUDAÇÃO DE 60S PARA 16 SEG, A MENSAGEM DE SAUDAÇÃO DA SECRETÁRIA ELETRÔNICA SERÁ CANCELADA, E O TEMPO DE GRAVAÇÃO DE RECADOS SERÁ LIMITADO EM 16 SEG.		
#58	AJUSTE DO ORIGINAL	NORMAL [NORMAL,CLARO,ESCURO]
#60	TRANSFERÊNCIA DE MENSAGEM	DESL. [LIGADO,DESL.]
#61	MENSAGEM DE TRANSFERÊNCIA	OUVIR MENS. [OUVIR MENS.,GRAVAR MENS.,APAGAR MENS.]
#67	MONITORA RECADO	LIGADO [LIGADO,DESL.]
#70	AVISO EM PAGER	DESL. [LIGADO,DESL.]
#76	TOM DE CONEXÃO	LIGADO [LIGADO,DESL.]
#80	AJUSTE DE FABRICA (EXCETO #48)	

Code

Set Value

Note:

The above values are the default values.

2.4.4. SERVICE FUNCTION TABLE

Code	Function	Set Value	Effective Range	Default	Remarks
501	Setting the pause time	001~600 X 100 msec	001~600	050	Selects the pause time in msec steps.
502	Setting the flash recall time	01~99 X 10 msec	01~99	74	Selects the line break time flashing in 10 msec steps.
503	Setting the pulse dial speed	1:10pps 2:20pps	1, 2	1	Sets the pulse dial speed.
510	VOX time	1:6 sec 2:4 sec	1, 2	1	Setting of the end of call confirmation time by VOX.
520	Setting the CED frequency	1:2100Hz 2:1100Hz	1, 2	1	When international communications cannot be performed smoothly select 1100Hz. However some external system should not be accurate (1100Hz on CED). (See "5. copy, but cannot transmit/long distance or international communications" in DEFECTIVE FACSIMILE SECTION ()).
521	Setting the international line mode	1:ON 2:OFF	1, 2	1	Selects the international line during FAX communication "5. Unit can copy, but cannot transmit/receive long distance international communication" in DEFECTIVE FACSIMILE SECTION ()).
522	Setting the return to default mode	1:ON 2:OFF	1, 2	1	Set the resolution and conditions for FAX or copy default settings.
523	Receive equalizer select	1:0km 2:1.8km 3:3.6km 4:7.2km	1~4	1	When the telephone station from the unit or reception be performed correctly, adjust accordingly.
524	Transmission equalizer select	1:0km 2:1.8km 3:3.6km 4:7.2km	1~4	1	When the telephone station from the unit or reception be performed correctly, adjust accordingly.
533	Setting the number of time that message transfer is redialed	00~99	00~99	05 times	Selects the number of times message transfer is redialed including the first dialing).
534	Setting the message transfer/paper call redial interval	001~999 sec	001~999	065 sec	Sets the interval of message transfer/paper call redial.

Code	Function	Set Value	Effective Range	Default	Remarks
544	Selecting the document feed position	01~99 step	00~99	50	When the ADF function is incorrect, adjust the feed position (8 step = 1mm)
550	Memory clear				Press "START/COPY/SET"
551	ROM version and sum check				Press "START/COPY/SET"
552	DTMF signal tone test	1:ON 2:OFF	1, 2	2	Press "START/COPY/SET"
553	Setting the FAX monitor function	1: OFF 2:PHASE B 3:ALL	1, 2, 3	1	Sets whether to monitor the signal with the unit's speaker during FAX communication
554	Modem test				Press "START/COPY/SET"
555	Scanner test				Press "START/COPY/SET"
556	Motor test				Press "START/COPY/SET"
557	LED test				Press "START/COPY/SET"
558	LCD test				Press "START/COPY/SET"
559	Setting the document jam detection	1:ON 2:OFF	1, 2	1	Selects the jam detection function during FAX transmission/copying.
560	Cutter selection	1:ON 2:OFF	1, 2	1	Turns OFF the cutter function
561	KEY test				Press any key.
562	Cutter test				Press "START" key. [Refer to the manual for the function]
570	Setting the % break	1:61% 2:67%	1, 2	1	Sets the % break of pulse width
571	Setting the number of times that ITS is redialed	00~99	00~99	05times	Selects the number of times ITS is redialed (not including the first dial).
572	Setting the ITS redial interval	001~999 sec	001~999	065 sec	Sets the interval of ITS redial
573	Setting of number of rings for REMOTE TURN ON	01~99	01~99	10 times	Sets the number of rings before the unit starts to receive a document in the TEL mode
580	TAM continuous tone detection	1:ON 2:OFF	1, 2	1	ON: Stops TAM operation when Dial tone, etc. are detected
590	Setting the number of FAX redial times	00~99	00~99	05 times	Selects the number of redial during FAX communication (including the first dial).
591	Setting the FAX redial interval	001~999 sec	001~999	065 sec	Sets the FAX redial interval during FAX communication.
592	Designation of CNG sending	1: OFF 2:ALL 3: AUTO	1, 2, 3	2	Lets you select the CNG output during FAX transmission. CNG is output at phase A. CNG is output only when automatic dialing is performed. OFF: CNG is not output at

Code	Function	Set Value	Effective Range	Default	Remarks
593	Setting the interval between CED and the 300 bps signal	1: 75 msec 2:500 msec 3:1000 msec	1, 2, 3	1	Sets the interval between 1 signal and subsequent 300 bps signal. (See "5. Unit can copy, but cannot transmit/receive long distance or international communications" in DEFECTIVE FACSIMILE SECTION (.))
594	Setting the overseas DIS detection	1: Detects on the 1st time.2: Detects on the 2nd time.	1, 2	1	Sets the recognition format for DIS signal. 1:Detects the first DIS signal sent from the receiver during FAX transmission. Ignores the first DIS signal from the receiver during FAX transmission. (See "5. Unit can copy, but cannot transmit/receive long distance or international communications" in DEFECTIVE FACSIMILE SECTION (.))
595	Setting an acceptable reception error value	001~999 X number of times	001~999	100	Sets the number of acceptable error lines when the FAX reconstructs the received signal.
596	Setting the transmit level	- 15~00	- 15~00	- 07 dBm	Selects the FAX transmission level.
598	Receiving Sensitivity	- 43dBm	20~48	40	(See "5. Unit can copy, but cannot transmit/receive long distance or international communications" in DEFECTIVE FACSIMILE SECTION (.))
717	Transmit speed select	1:9600BPS 2: 7200BPS 3: 4800BPS 4: 2400BPS	1~4	1	Adjusts the speed to start during FAX transmission.
718	Receive speed select	1:9600BPS 2: 7200BPS 3: 4800BPS 4: 2400BPS	1~4	1	Adjusts the speed to start during FAX reception.
719	Ringer off in TEL/ FAX mode	1:ON 2:OFF	1, 2	1	Sets the ringer switch off when a call is received in the TEL/ FAX mode.
721	Pause tone detect	1:ON 2:OFF	1, 2	1	Selects the tone detection pauses in dialing.
722	Redial tone detect	1:ON 2:OFF	1, 2	1	Selects the tone detection after redialing.
731	CPC mode	1:A 2:B 3:OFF	1, 2, 3	1	Set the CPC signal detection mode from the converter.

Code	Function	Set Value	Effective Range	Default	Remarks
737	Jank corect call	1:10sec 2:20sec 3:30sec	1, 2, 3	2	-----
763	CNG detect time	1:10 sec 2:20 sec 3:30 sec	1, 2, 3	2	Selects the CNG detection friendly reception.
771	T1 timer	1:35 sec 2:60 sec	1, 2	1	Sets a higher value when t response from the other p needs more time during F transmission.
774	T4 timer	00~99	00~99	00	
775	Monitoring of message transfer	1:ON 2:OFF	1, 2	2	If set to ON a message car monitored from this unit's PHONE when transferring message.
784	Voice prompt test				You can hear the voice pro from speaker after pressin "START" key.
815	Sensor check				Press "START/COPY/SET"
841	Digital SP-Phone check				See DIGITAL SPEAKERPH
882	Journal 3 list				See PRINTOUT EXAMPLE

2.4.5. SERVICE MODE SETTINGS (Example of a printed out list)

【 SERVICE DATA LIST 】

501 PAUSE TIME	=	050*100ms	[001...600]*100ms
502 FLASH TIME	=	74*10ms	[01...99]*10ms
503 DIAL SPEED	=	10pps	[1=10 2=20]pps
510 VOX TIME	=	6sec	[1=6 2=4]sec
520 CED FREQ.	=	2100Hz	[1=2100 2=1100]Hz
521 INTL. MODE	=	ON	[1=ON 2=OFF]
522 AUTO STANDBY	=	ON	[1=ON 2=OFF]
523 RCV EQL.	=	0.0Km	[1=0.0 2=1.8 3=3.6 4=7.2]Km
524 SND EQL.	=	0.0Km	[1=0.0 2=1.8 3=3.6 4=7.2]Km

Code

Set Value

【 SPECIAL SERVICE SETTINGS 】

533	534	544	552	553	559	560	570	571	572	573	580	590
05	065	50	2	1	1	1	2	05	065	10	1	05
591	592	593	594	595	596	598	717	718	719	721	722	731
065	2	1	1	100	07	41	1	1	1	1	1	1
763	771	774	775									
2	1	00	2									

Note:

The above values are the default values.

【 HISTORY 】

1. DATE

TIME=00002 HOURS

2. KEY OPERATION

1ST. 50:

32 35 03 3B 3A 3B 3A 0F 05 05 04 0C 0C 05 05 04 31 32 33 34 04 32 34 04 04
04 08 08 04 05 3C 30 31 04 38 32 04 39 3A 3A 3A 3B 04 00 00 00 00 00 00 00

LAST 50:

04 08 08 04 05 3C 38 31 04 38 32 04 39 3A 3A 3A 3B 04 00 00 00 00 00 00 00
00 00

3. NUMBER OF COPY

=00000

4. NUMBER OF RX

=00000

5. NUMBER OF TX

=00000

YOUR LOGO

YOUR FAX NUMBER

2.4.6. OTHER

[HISTORY]

No.	Display	Function
1	DATA	Date and time which are set by a user for the first time after purchase. TIME is the expiration from the first power on after purchase.
2	KEY OPERATION	Indicate 2-digit codes. (Refer to BUTTON CODE TABLE ()). 1st.50: History of the key operation from 1st to 50th after purchase. Last.50: History of the last 50 key operations.
3	NUMBER of COPY	The number of pages copied..
4	NUMBER of RX	The number of pages received.
5	NUMBER of TX	The number of pages sent.

CROSS REFERENCE:
[BUTTON CODE TABLE](#) ()

2.4.7. SPECIAL SERVICE JOURNAL REPORTS

Example:

Journal 3 shown below, which are special journals giving the additional detailed information about the latest 35 communications, can be printed by Service Code 882. Remote printing function for the journal reports (JOURNAL and JOURNAL 3) is also available for service technicians. (Refer to [REMOTE PROGRAMMING](#) ().) The JOURNAL report only gives you basic information about a communication, but the JOURNAL 3 report provide different information on the same item (communication).

RELATÓRIO DE TRANSMISSÃO 3

01 JAN 2000 09:04

*

NO.	OUTRO FAC-SIMILE	INICIO	DURACAO	MODC	PAGINAS	RESULTADO
01	182	01 JAN 00:02	00:31	ENV.	01	OK
02	(PROV COM PROBLEMA)	01 JAN 00:03	00:25	RCE.	01	OK

43

JOURNAL 3

Jan. 12 2000 09:51PM

NO.	(1) ENYTOR	(2) MSLT	(3) RESOL	(4) SPEED	(5) RCV-TRIG	(6) FWM(EXT)	(7) ERROR	(8) LINE(EXT)	(9) MAKER CODE
01	MH	20msc	STD.	9600BPS	MAN	RCV	000000	00000	79

HOW TO READ JOURNAL REPORTS:

1. Look at NO. 01 in the JOURNAL. If you want to know about the details about that item, see NO. 01 in the JOURNAL 3. You can get the following information.
* MODE: Fax transmission / * TX SPEED: 9.6 kbps / * RESOLUTION : standard / * ENCODE: MH / * MAKER CODE: 79

For further details, see [JOURNAL 3](#) ().

2.4.7.1. JOURNAL 3

Descriptions:

1. ENCODE

Compression Code: MH/MR

2. MSLT

MSLT means Minimum Scan Line Time. Used only at the factory.

3. RESOLUTION (RESOL)

Indicates the resolution of the communication. If multiple pages are transmitted or received, it indicates the last page's resolution. If there is a communication error, “?” is displayed.

4. SPEED

Indicates the speed of communication. If multiple pages are transmitted or received, it indicates the last page's communication speed. If there is a communication error, "?" is displayed.

5. RCV-TRIG. (CNT.)

Indicates the trigger that causes the unit to switch to the fax receive mode. The available options are listed in JOURNAL 3 in 2.4.7.2. PRINTOUT EXAMPLE. The values in parentheses indicate how many times the trigger has been used. (For example, "0003" means three times.)

No.	Display	Function
1	FAX MODE	Means the unit received a fax message in the FAX mode.
2	MAN RCV	Means the unit received a fax message by manual operation.
3	FRN RCV	Means the unit received a fax message by friendly signal detection.
4	RMT DTMF	Means the unit detected DTMF (Remote Fax activation code) entered remotely.
5	PAL DTMF	Means the unit detected DTMF (Remote Fax activation code) entered by a parallel connected telephone.
6	TURN-ON	Means the unit started to receive after 15 rings. (Remote Turn On: Service Code #573)
7	TIME OUT	Means the unit started to receive after Ring Time Out in the EXT-TAM or TEL/FAX mode.
8	IDENT	Means the unit detected Ring Detection.
9	TEL/FAX	Means the unit detected the CNN while it was sending the Dummy Ring Back To in the TEL/FAX mode.

[NO RESPONSE DISAPPEARED ON JOURNAL]

The "NO RESPONSE DISAPPEARED ON JOURNAL" displays the information about the last 10 communications terminated by "No Response". (Some of the communications terminated by "No Response" were not displayed in the JOURNAL.) When a fax transmission cannot be performed because the other party's unit is set to the TEL mode, "No response" will be printed.

6. EQM

EQM means Eye Quality Monitor. Used only at the factory.

7. ERROR LINE(RX)

When an error occurs while receiving a fax, this shows the number of error lines.

8. MAKER CODE

This shows a 2 digit code of the other party's fax machine brand.
0E: "KX" model / 00: Unknown / 79: "UF" model / 19: "Xerox"
model

2.4.7.2. PRINTOUT EXAMPLE

[JOURNAL3]

01 ENE. 1999 12:04AM

NO.	ENCODE	MSLT	RESOL	SPEED	RCV-TRIG.	EGM(RX)	ERROR LINE(RX)	MAKER CODE
01	MR	20mSec	STD.	9600BPS	?	000000	00000	0E

2.5. TEST FUNCTIONS

Test Mode	Type of Mode	Code	Function
		Operation after code input	
PRINT TEST	Service Mode	"8" "5"	Prints a test pattern and checks the thermal head abnormalities (missing dots, etc), and also checks operation of the reception motor.(Refer to JOURN
		START	
MOTOR TEST	Service Mode	"5" "5" "6"	Rotates the transmission and reception motors to the operation of the motors. 0.....Stop 1.....Turn forward TX roller at 400pps 2-2 phase 2.....Turn forward TX roller at 400pps 1-2 phase 3.....Turn forward RX roller at 400pps 2-2 phase 4.....Turn forward RX roller at 400pps 1-2 phase 5.....Turn forward TX/RX roller at 400pps 1-2 phase 6.....Reverse the motor at 400pps 1-2 phase 7.....Set the cam gear to the home position 8.....Set the cam gear to the RX mode 9.....Set the cam gear to the copy mode press the STOP button to cancel.
		START	
MODEM TEST	Service Mode	"5" "5" "4"	Sends four kinds of FAX signals to check the send function of the modem. / 1)1100 Hz: Consecutive : EOM for tonal / 2)2100 Hz: G2 carrier signal / Cor of CED signal / 3)G3,V29 training signal [modulation of carrier signal (1700 Hz)]
		START	
ROM CHECK	Service Mode	"5" "5" "1"	Indicates the version and checks the sum of the F
		START	
SCAN CHECK	Service Mode	"5" "5" "5"	Turns on the LEDs of the image sensor and operation read systems.
		START	
LCD CHECK	Service Mode	"5" "5" "8"	Checks the LCD indication.Illuminates all the dots if they are normal.
		START	
DTMF SINGLE TEST	Service Mode	"5" "5" "2"	Outputs the DTMF as single tones. Used to check frequencies of the individual DTMF tones. Refer to SINGLE TONE TRANSMIT SELECTION ().
		1....ON 2....OFF	

Test Mode	Type of Mode	Code	Function
		Operation after code input	
KEY CHECK	Service Mode	"5" "6" "1"	Checks the button operation.
		START (any key)	Indicates the button code on the LCD while the button is pressed. Refer to BUTTON CODE TABLE ().
FACTORY SET	Service Mode	"5" "5" "0"	Clears the memory where the users can store data.
		START	
SENSOR CHECK & VOX CHECK	Service Mode	"8" "1" "5"	CHECKS THE SENSOR OPERATION After entering this mode, perform the copy operation. For each sensor's operation, refer to SENSORS AND SWITCHES (). [Do Sn Pa] : LCD DISPLAY Do: Document set sensor :Paper inserted. Turns on when a document is inserted. Sn: Read position sensor. :At the read position, turns on when the front cover is opened and the sensor lever is pressed directly. Pa: Recording Paper Sensor :Set Recording Paper. Turns on and off when the lock lever is pushed down and up.
		START	
LED CHECK	Service Mode	"5" "5" "7"	Turn on the message LED.
		START	
DIGITAL SPEAKERPHONE RX & TX CHECK	Service Mode	"8" "4" "1"	Please refer to DIGITAL SPEAKERPHONE ()
		SPEAKERPHONE	

2.5.1. DTMF SINGLE TONE TRANSMIT SELECTION

When set to ON (=1), the 12 keys and transmission frequencies are as shown.

key	High Frequency (Hz)	key	Low Frequency (Hz)
"1"	697	"5"	1209
"2"	770	"6"	1336
"3"	852	"7"	1477
"4"	941	"8"	1633



When set to OFF (=2), the 12 keys and transmission frequencies are as shown.

High (Hz)	1209	1336	1477
Low (Hz)			
697	"1"	"2"	"3"
770	"4"	"5"	"6"
852	"7"	"8"	"9"
941	" X "	"0"	"#"

Note:

After performing this check, do not forget to turn the setting off.
Otherwise, dialing in DTMF signal will not work.

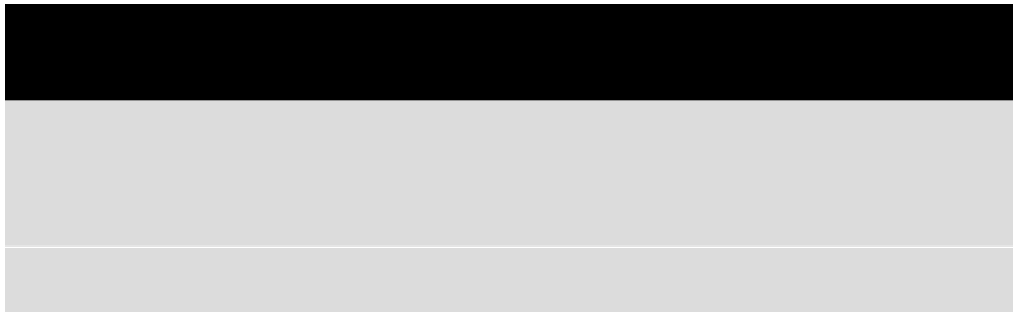
2.5.2. BUTTON CODE TABLE

Code	Button Name	Code	Button Name	Code	Button Name
02	RESOLUTION	0F	BROAD CAST	89	9
03	RECEIVE MODE	14	RECORD	3A	0
04	FAX/START	16	ERASE	3B	X
05	MEMU	18	PLAY MESSAGE	3C	#
07	HELP	31	1	3D	REDIAL/PAUSE
08	SP-PHONE	32	2	3D	REDIAL/PAUSE
09	COPY	33	3	3D	REDIAL/PAUSE
0A	MUTE	34	4	3E	FLASH
0B	PREV	35	5	00	NO INPUT
0C	NEXT	36	6	01	STOP
0D	 VOLUME	37	7		
0E	 VOLUME	38	8		

Note:

These codes (00, 01) are only for the data in the History Report.

2.5.3. PRINT TEST PATTERN



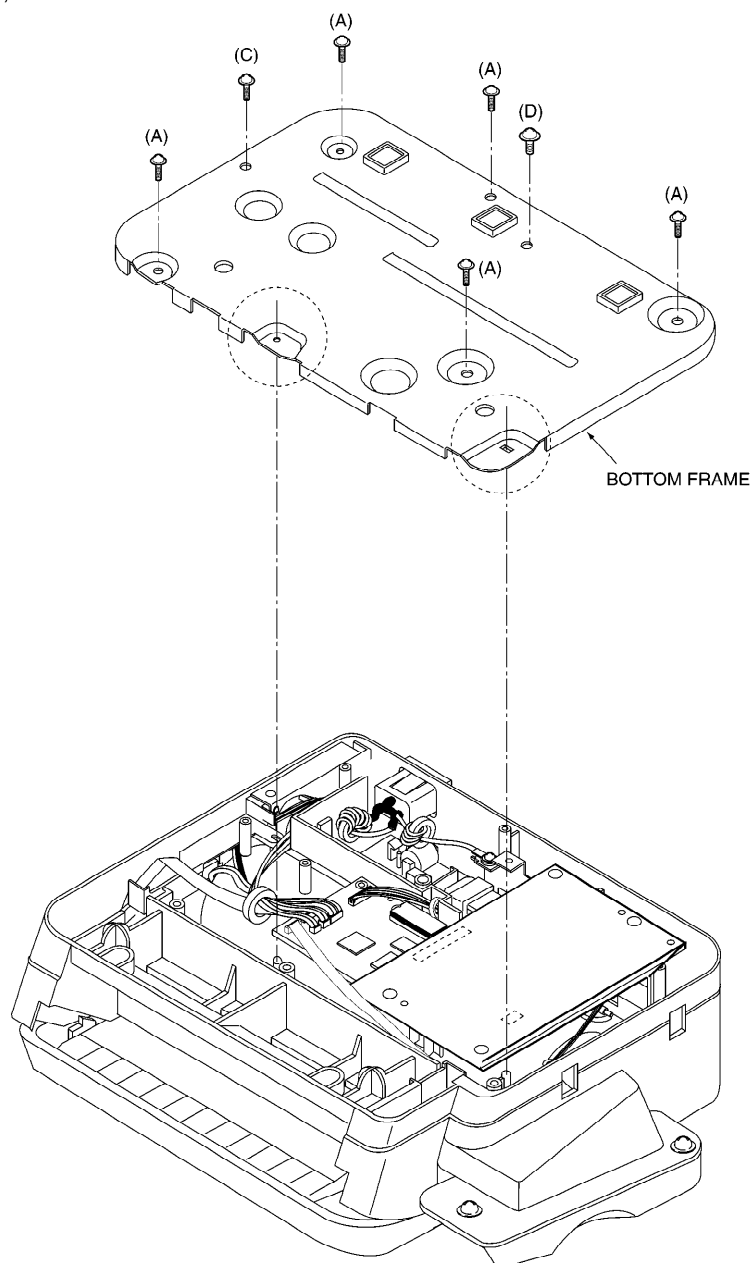
3. DISASSEMBLY INSTRUCTIONS

3.1. HOW TO REMOVE THE BOTTOM FRAME

Procedure 1

Ref. No. 1

- 1) Remove the 7 screws (A),(C),(D).
- 2) Remove the Bottom frame.

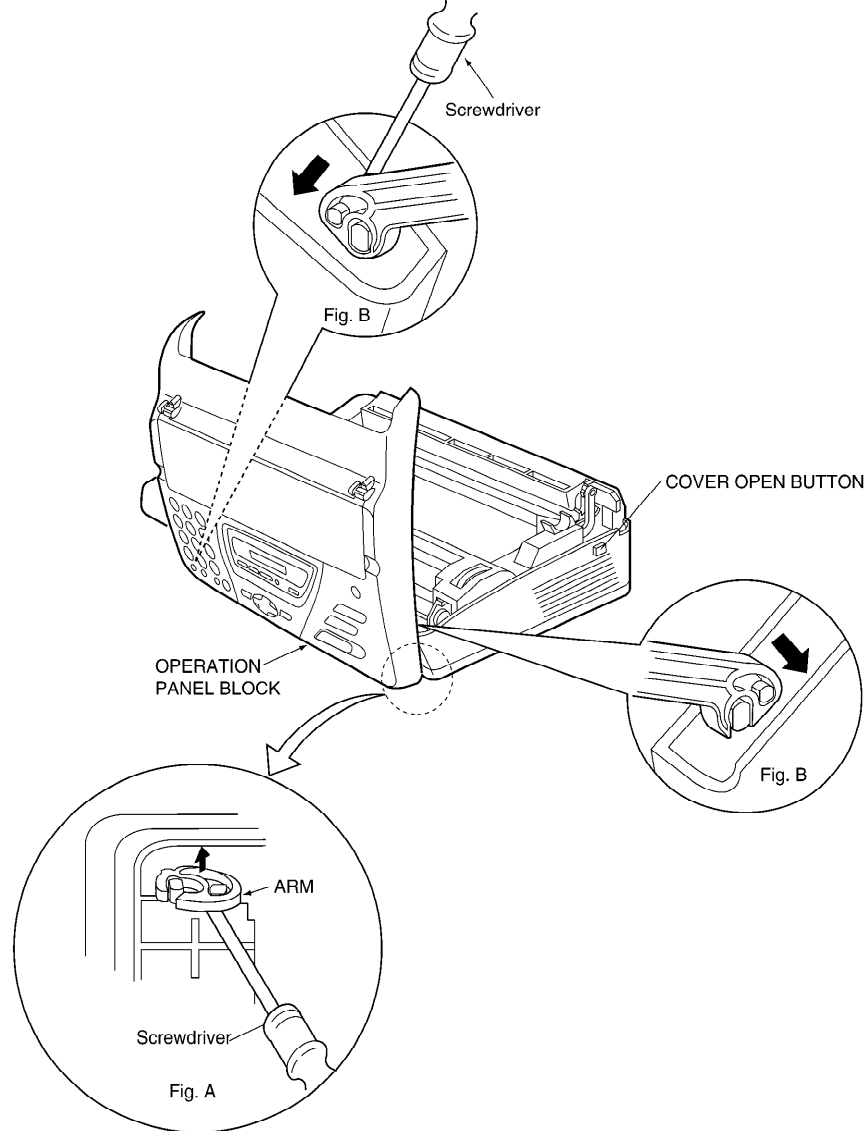


3.2. HOW TO REMOVE THE OPERATION PANEL BLOCK

Procedure 2

Ref. No. 2

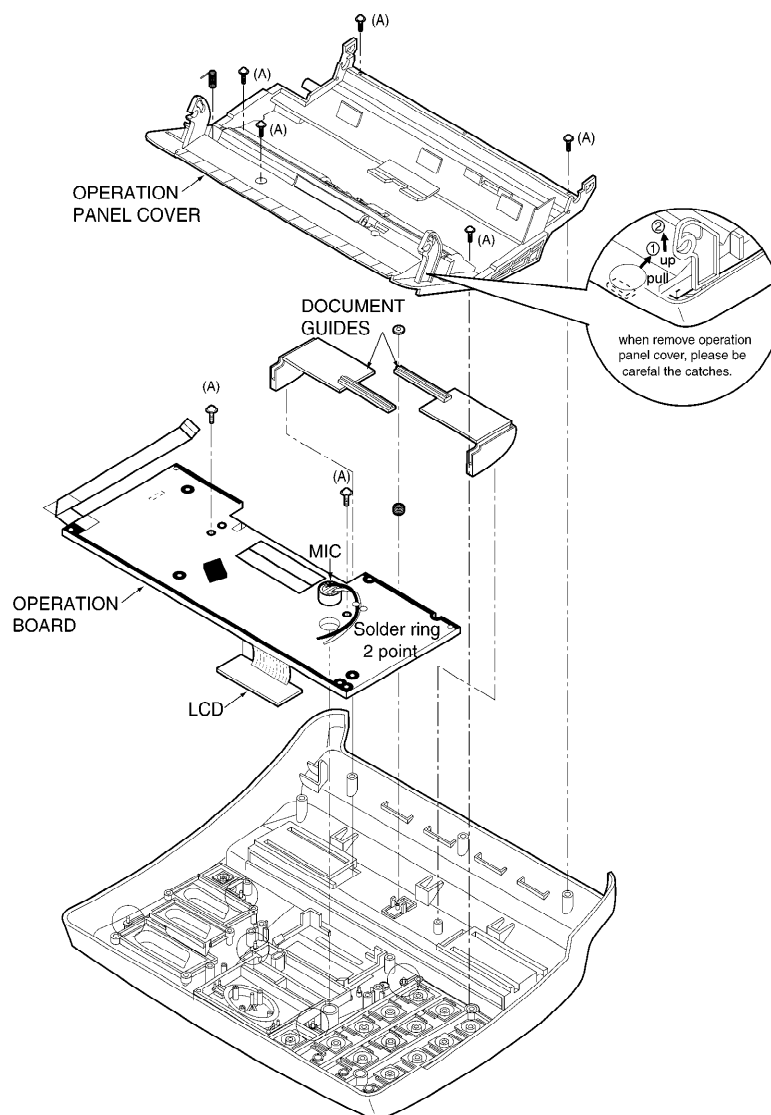
- 1) Unhook all the connectors connecting the main cabinet with the OPERATION PANEL BLOCK .
- 2) Push the cover open button in the direction of the arrow to open the operation block.
- 3) Tilt the unit vertically so that its left side faces down the grey-shaded ARM as illustrated in Fig. A, insert a screwdriver and unlatch the ARM as illustrated in Fig. A.
- 4) Pull out both sides of the arms (in the direction of the arrow shown in Fig. B).
- 5) Remove the OPERATION PANEL BLOCK.



3.3. HOW TO REMOVE THE OPERATION BOARD AND LCD

Ref. No. 3

- 1) Remove the 5 screws (A) of the operation panel cover.
- 2) Remove the 2 screws (A) of the operation Board.
- 3) Remove the mic.
- 4) Remove the operation board.
- 5) Remove the document guides.

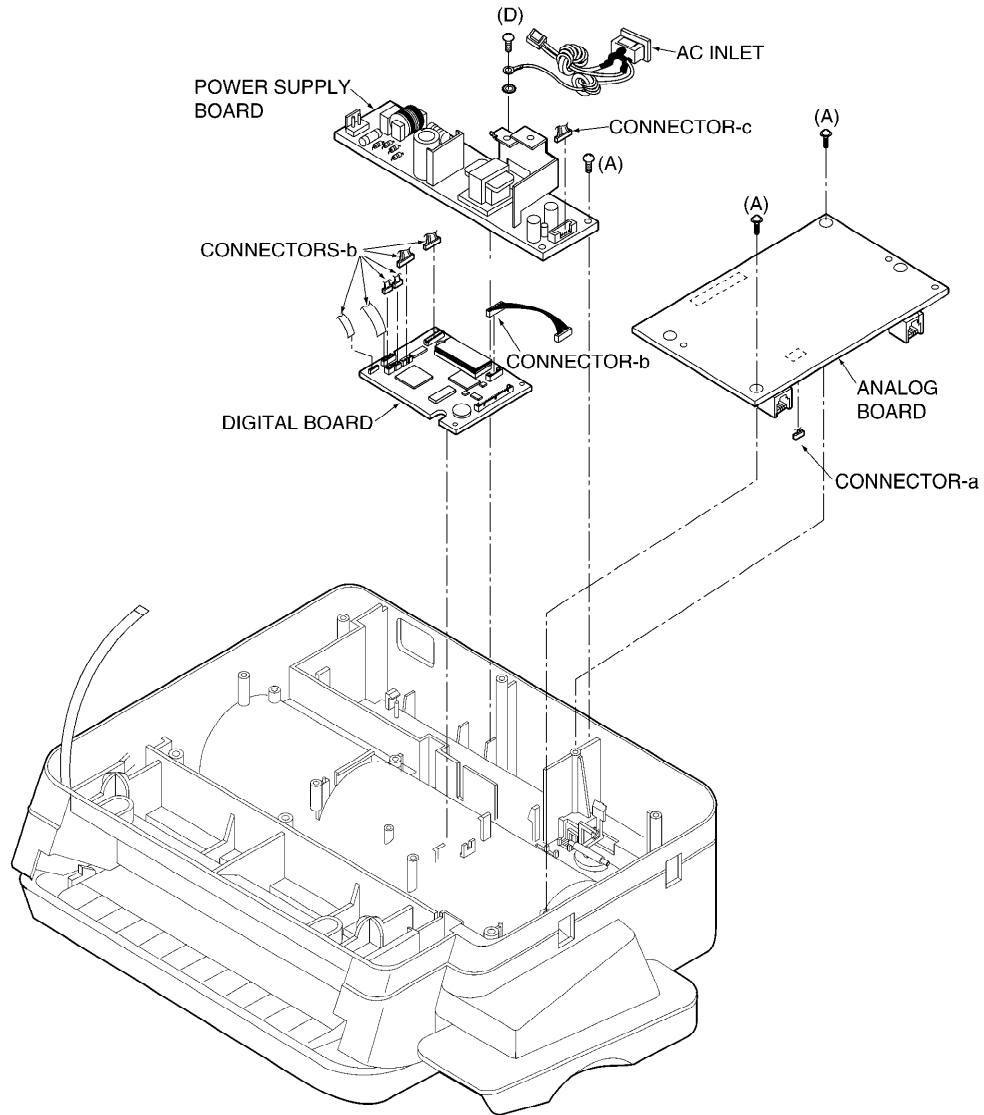


3.4. HOW TO REMOVE THE DIGITAL, ANALOG AND POWER SUPPLY BOARD AND AC INLET

Procedure 1 → 4

Ref. No. 4

- 1) Remove the 2 screws (A).
- 2) Remove the connector-a.
- 3) Remove the ANALOG BOARD.
- 4) Remove the connectors-b.
- 5) Remove the DIGITAL BOARD.
- 6) Remove the 2 screws (A),(D).
- 7) Remove the connector-c.
- 8) Remove the POWER SUPPLY BOARD.
- 9) Remove the AC INLET.

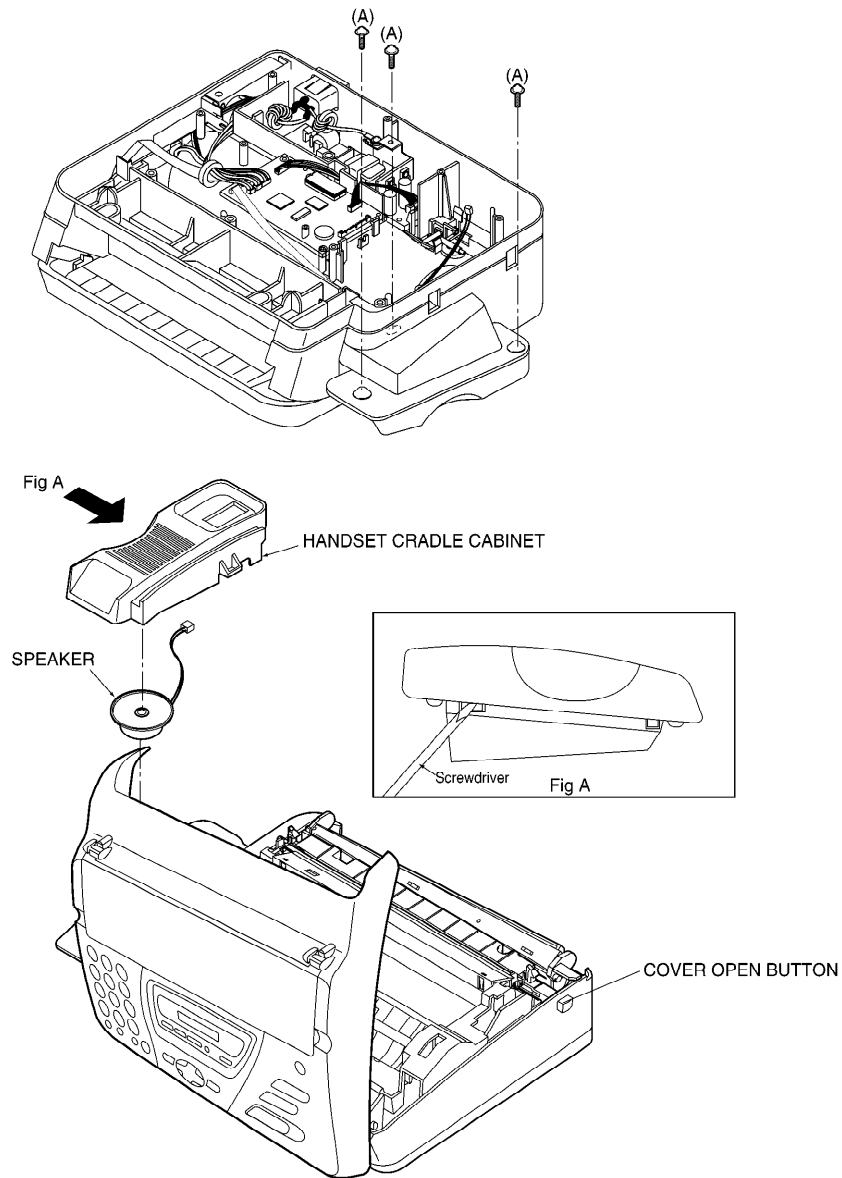


3.5. HOW TO REMOVE THE HANDSET CRADLE CABINET AND SPEAKER

Procedure 1→5

Ref. No. 5

- 1) Remove the 3 screws (A).
- 2) Push the cover open button.
- 3) Remove the HANDSET CRADLE CABINET.(see Fig.A).
- 4) Remove the SPEAKER.



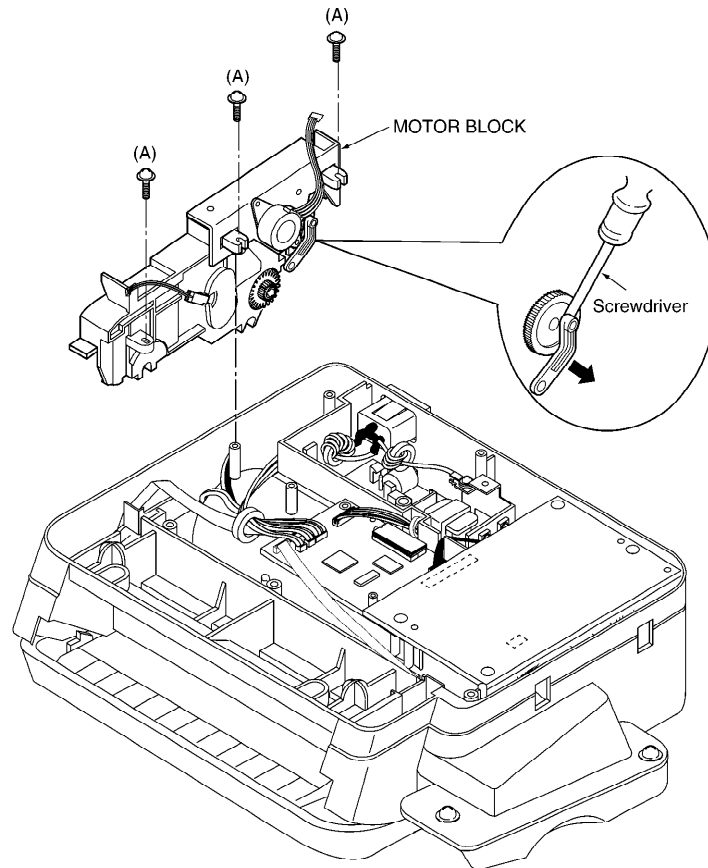
3.6. HOW TO REMOVE THE MOTOR BLOCK

Procedure 1→6

Ref. No. 6

- 1) Remove the 3 screw (A).
- 2) Remove the MOTOR BLOCK.

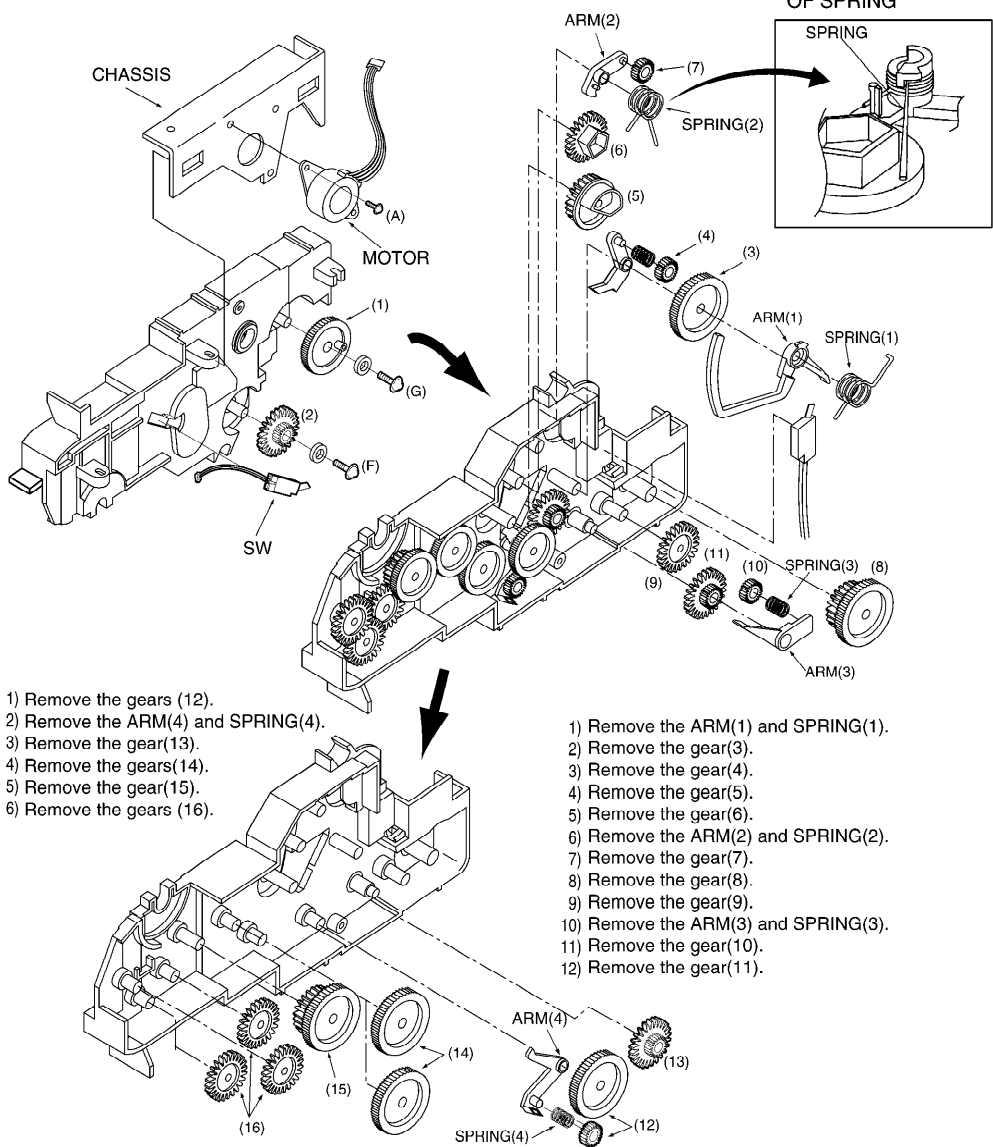
Note: When install the Motor Block into the unit, Please refer to **HOW TO REMOVE THE THERMAL HEAD AND CUTTER BLOCK.**



CROSS REFERENCE:

HOW TO REMOVE THE THERMAL HEAD AND CUTTER UNIT ()

- 1) Remove the screw (A).
- 2) Remove the MOTOR and CHASSIS.
- 3) Remove the SW.
- 4) Remove the screw (G).
- 5) Remove the gear (1).
- 6) Remove the screw (F).
- 7) Remove the gear (2).

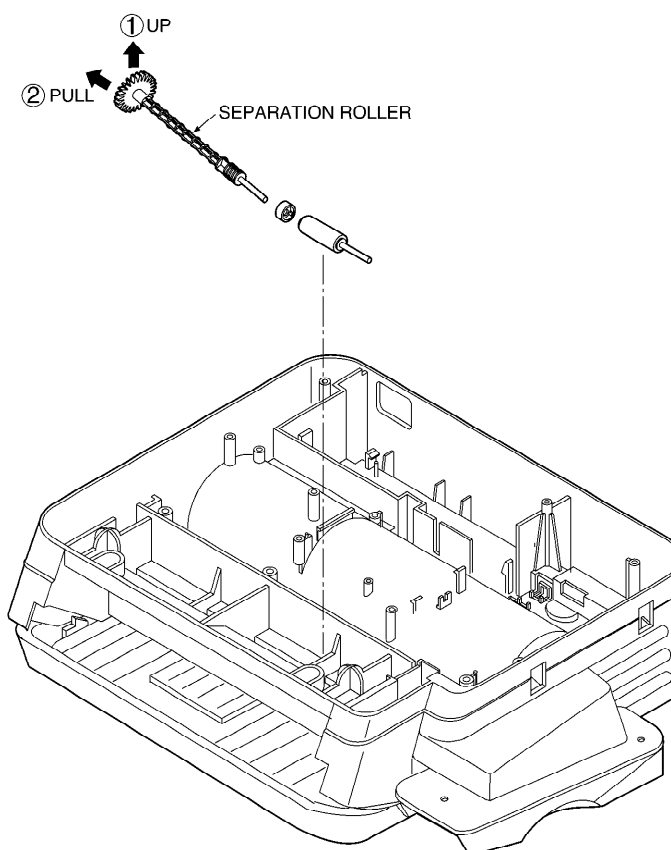


3.7. HOW TO REMOVE THE ROLLERS

Procedure 1→4→6→7

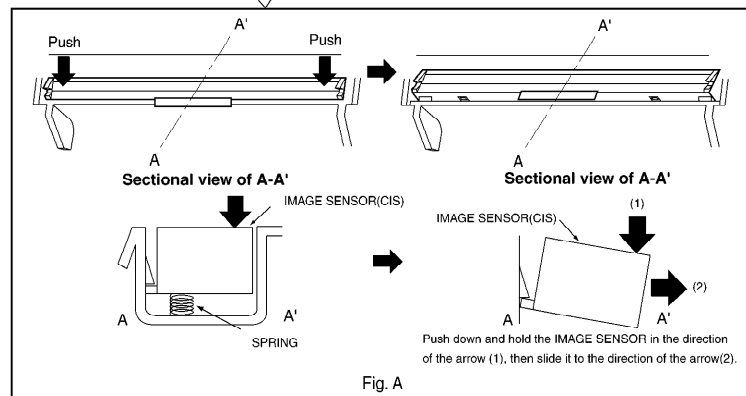
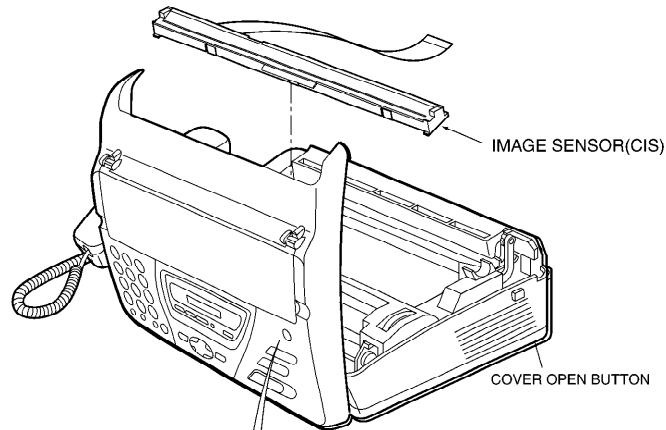
Ref. No. 7

1) Remove the SEPARATION ROLLER.

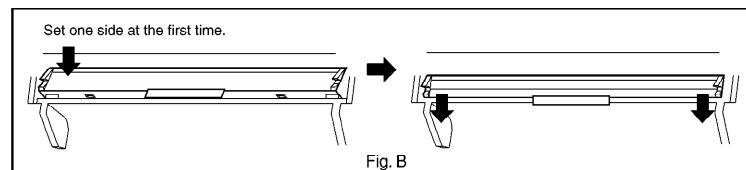


3.8. HOW TO REMOVE THE IMAGE SENSOR

- 1) Push the cover open button.
- 2) Remove the image sensor (Refer to Fig.A.)



HOW TO INSTALL THE IMAGE SENSOR

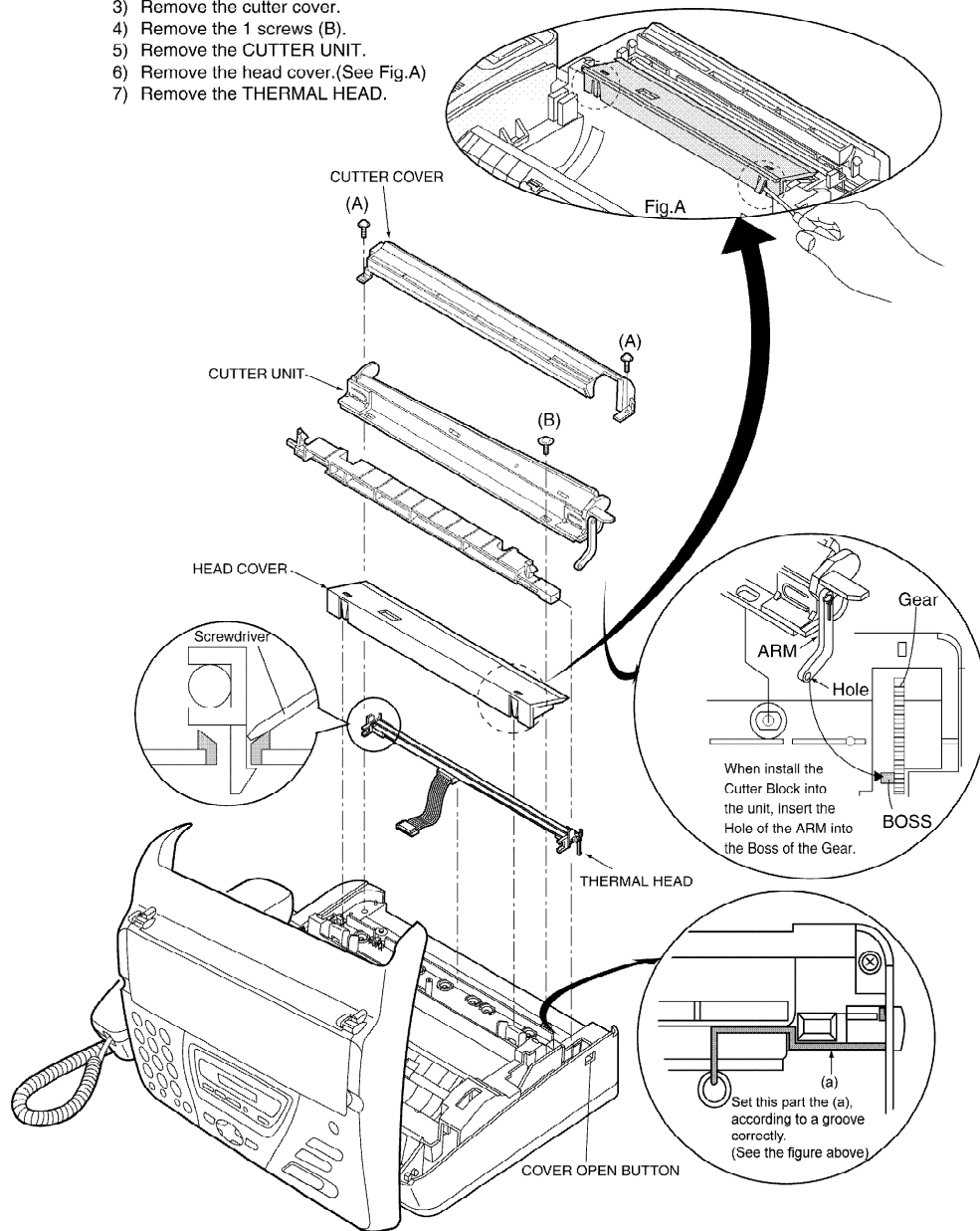


3.9. HOW TO REMOVE THE THERMAL HEAD AND CUTTER UNIT

Procedure 9

Ref. No. 9

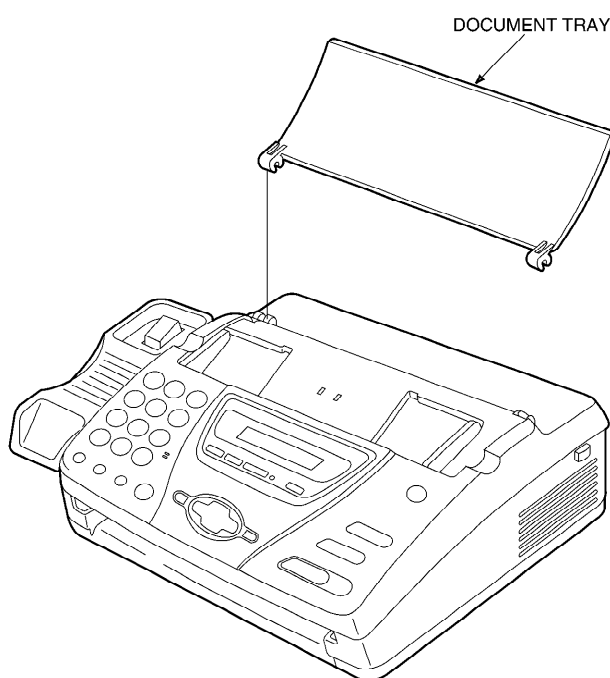
- 1) Push the cover open button.
- 2) Remove the 2 screws (A).
- 3) Remove the cutter cover.
- 4) Remove the 1 screws (B).
- 5) Remove the CUTTER UNIT.
- 6) Remove the head cover.(See Fig.A)
- 7) Remove the THERMAL HEAD.



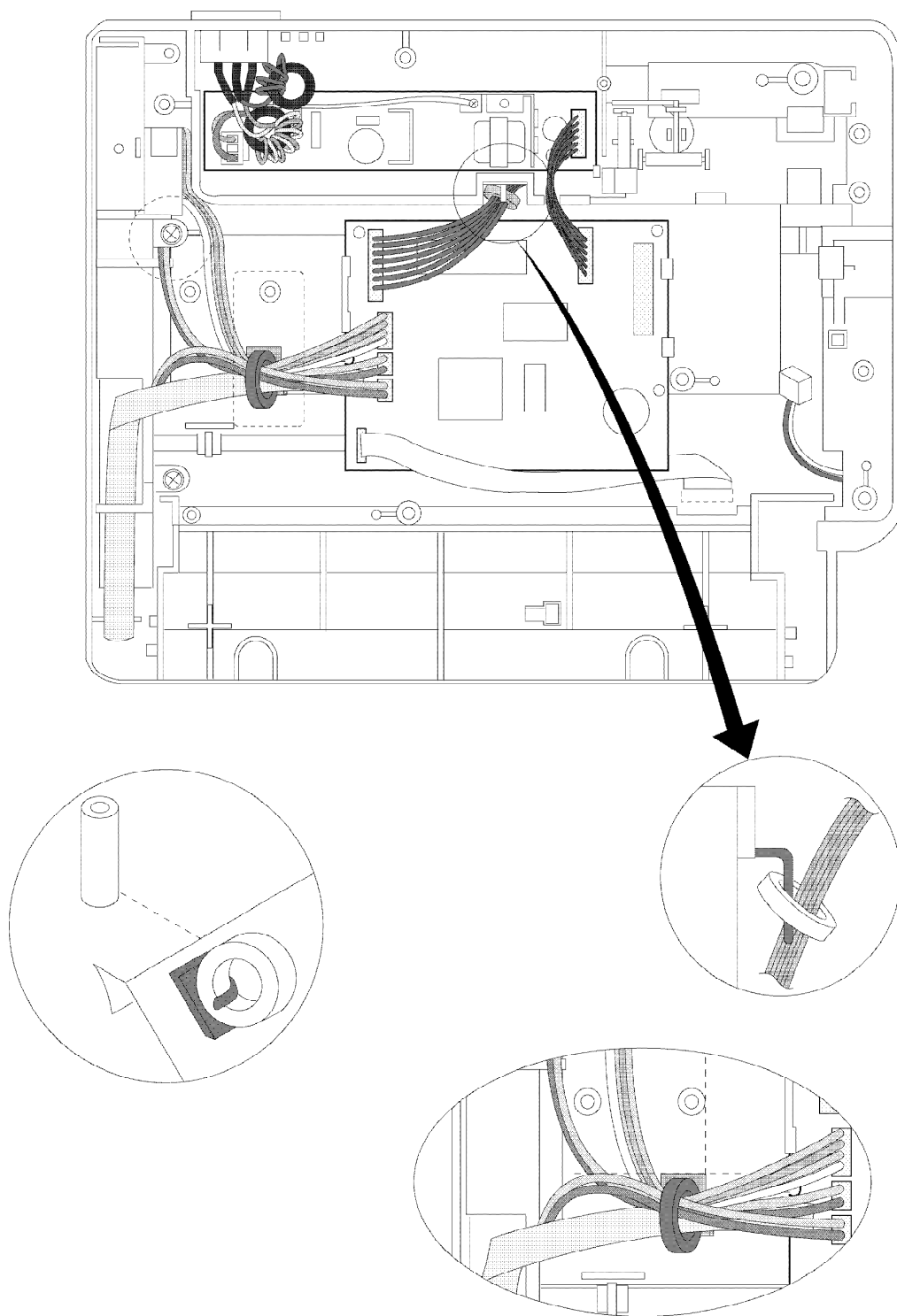
3.10. HOW TO REMOVE THE DOCUMENT TRAY

Procedure 10

Ref. No. 10 1) Remove the DOCUMENT TRAY.

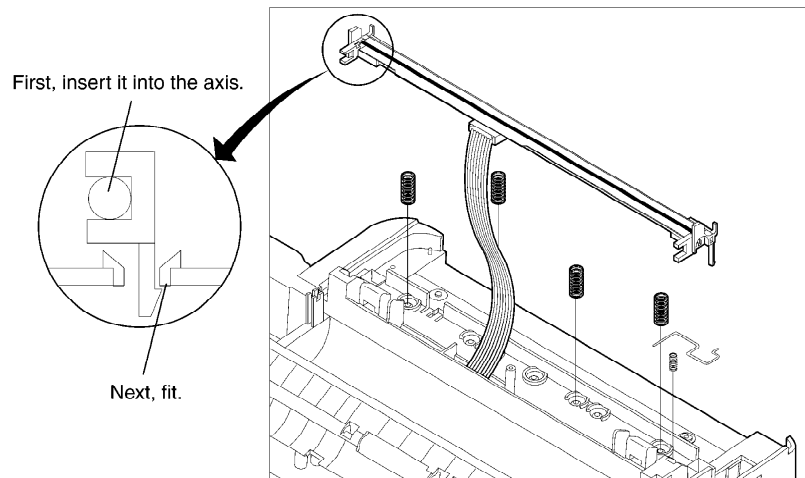


3.11. INSTALLATION POSITION OF THE LEAD WIRES



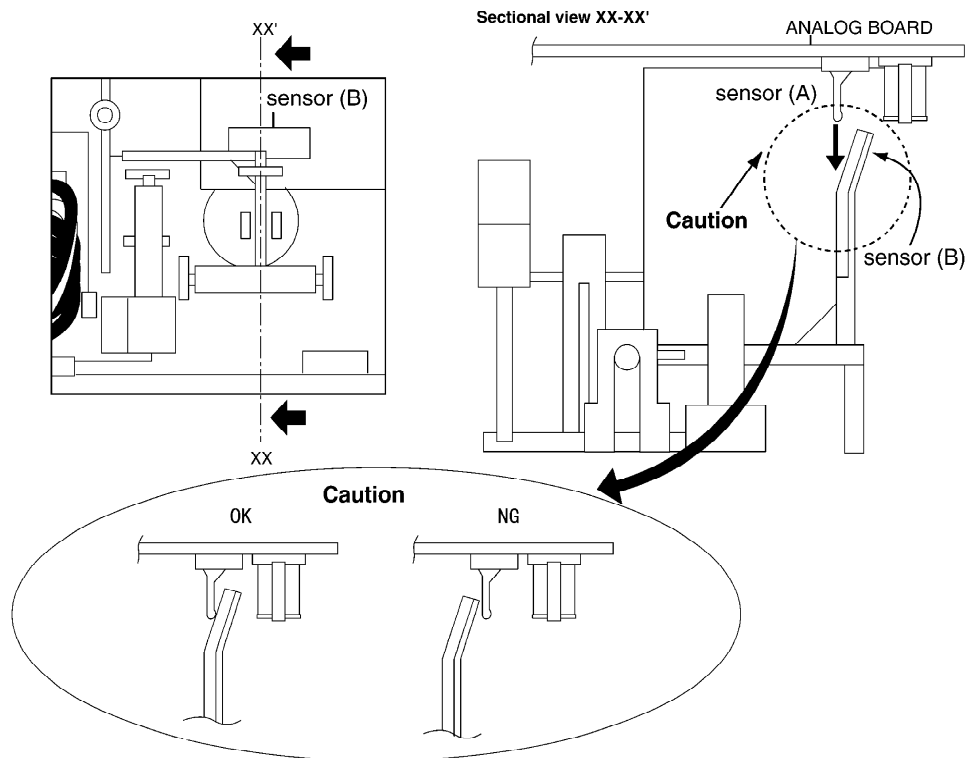
3.12. INSTALLATION OF THERMAL HEAD AND ANALOG BOARD

INSTALLATION OF THERMAL HEAD



INSTALLATION OF ANALOG BOARD

Before installing the ANALOG BOARD, make sure that the thermal paper is removed completely. When installing the ANALOG BOARD, make sure that the sensor lever(B) is set in the position of the bellow figure.



4. HOW TO REPLACE THE FLAT PACKAGE IC

If you do not have the special tools (for example: SPOT HEATER) to remove the SPOT HEATER'S Flat IC, if you have solder (large amount), a soldering iron, and a cutter knife, you can easily remove the ICs even if there are more than 100 pins.

4.1. PREPARATION

- SOLDER

Sparkle Solder 115A-1, 115B-1 OR Almit Solder KR-19, KR-19RMA

- Soldering iron

Recommended power consumption is between 30 W to 40 W. /
Temperature of Copper Rod $662 \pm 50^{\circ}\text{F}$ ($350 \pm 10^{\circ}\text{C}$) / (An expert
may handle a 60~80 W iron, but a beginner might damage the foil
by overheating.)

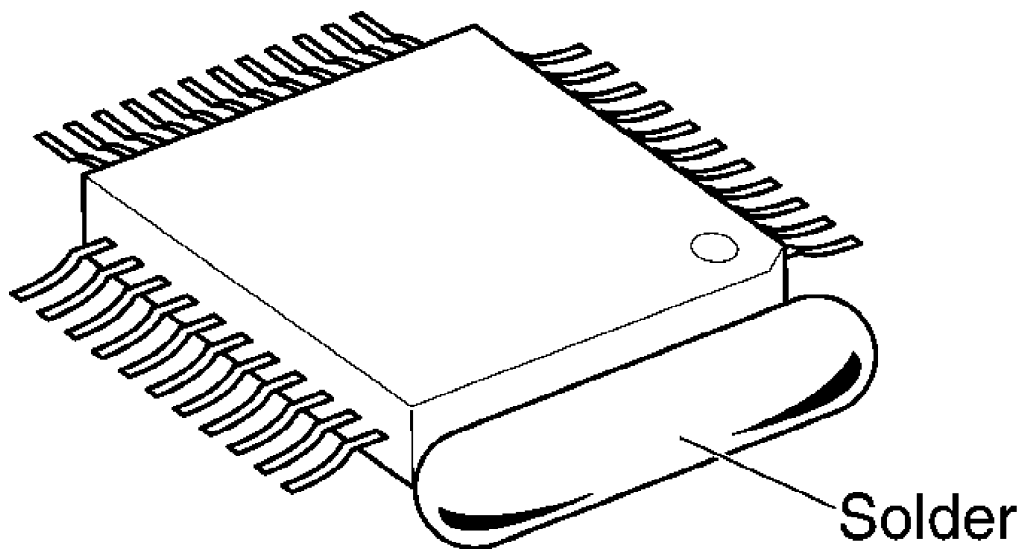
- Flux / HI115 Specific gravity 0.863 / (Original flux should be
replaced daily.)

4.2. FLAT PACKAGE IC REMOVAL PROCEDURE

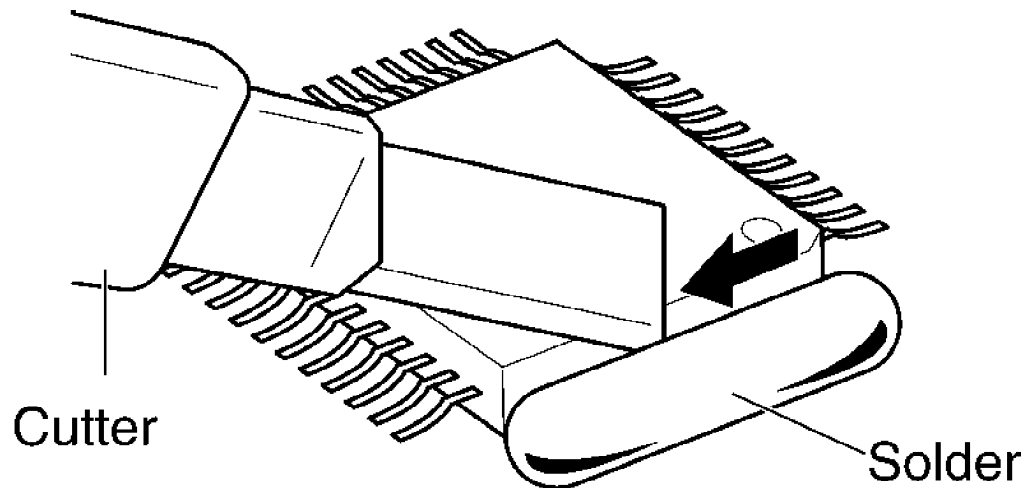
1. When all of the IC lead cannot be seen at the standard degree,
fill with large quantities of solder.

Note:

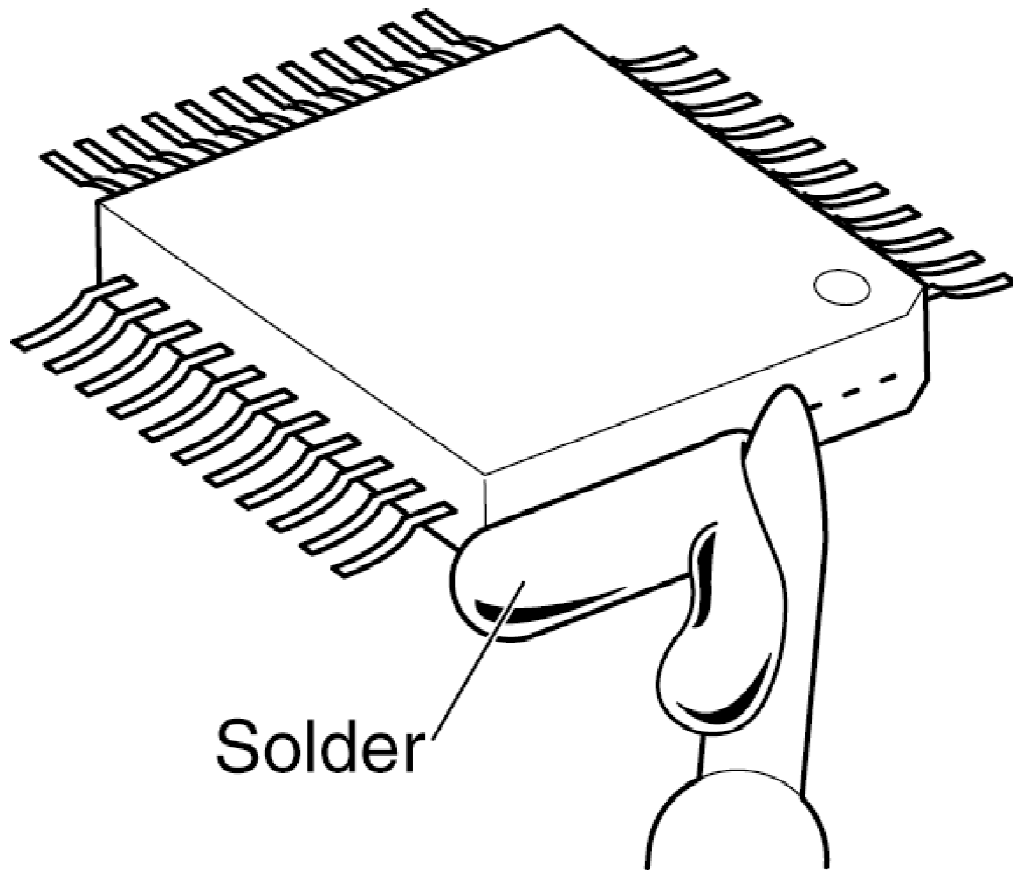
If you do not fill with solder and directly cut the IC lead with the cutter, stress may build up directly in the P.C. board's pattern. If you do not fill with large quantities of solder as in step 1, the P.C. board pattern may be removed.



2. Using a cutter, cut the lead at the source. (Cut the contents with a
cutter lightly, 5 or 6 times.)



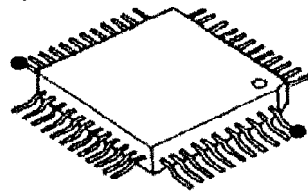
3. Remove when the solder melts. (Remove the lead at the same time.)



After removing the Flat IC and when attaching a new IC, remove any of the excess solder on the land using the soldering wire, etc. If the excess solder is not removed from the land, the IC will slip and not be attached properly

4.3. FLAT PACKAGE IC INSTALLATION PROCEDURE

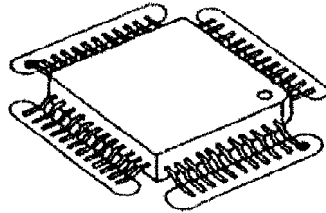
- 1) Temporarily fix the FLAT PACKAGE IC by soldering on the two marked pins.



● ————— Temporary soldering point.

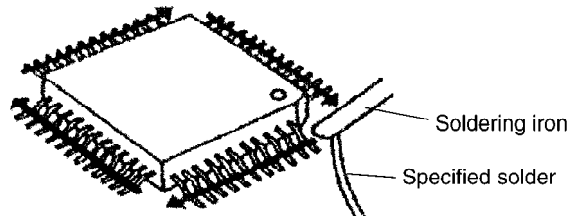
*Check the accuracy of the IC setting with the corresponding soldering foil.

- 2) Apply flux to all pins of the FLAT PACKAGE IC.



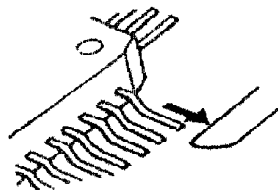
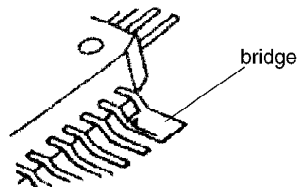
————— Flux

- 3) Solder using the specified solder, in the direction of the arrow, by sliding the soldering iron.



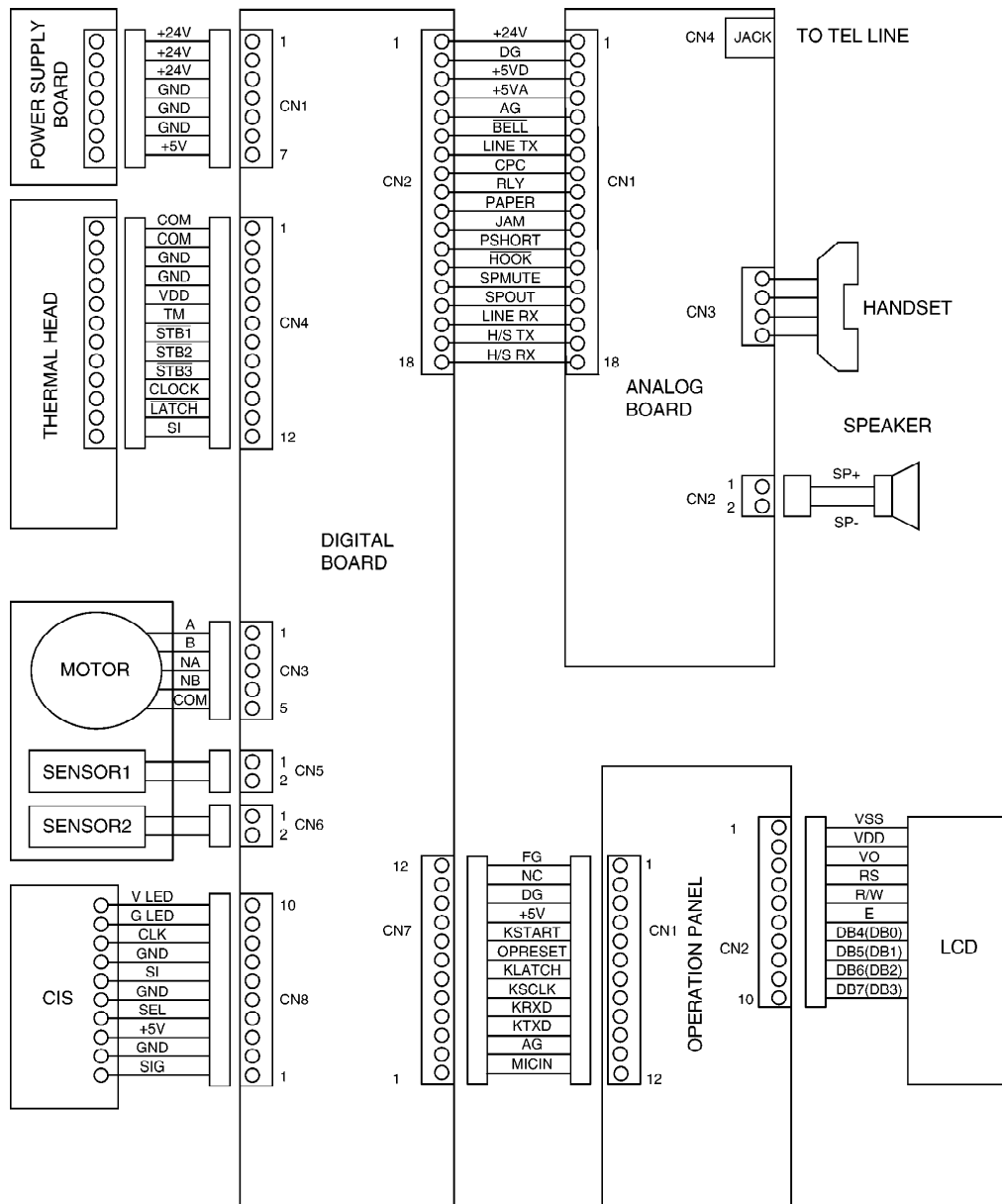
4.4. BRIDGE MODIFICATION PROCEDURE

- 1) Lightly re-solder the bridged portion.
- 2) Remove the remaining solder along the pins using a soldering iron as shown in the figure below.



5. CIRCUIT OPERATIONS

5.1. CONNECTION DIAGRAM



5.2. GENERAL BLOCK DIAGRAM

The control section will be explained as shown in the block diagram.

1. ASIC (IC1)

Composed mainly of an address decoder, modem control section, CPU and RTC.

Controls the general FAX operations.

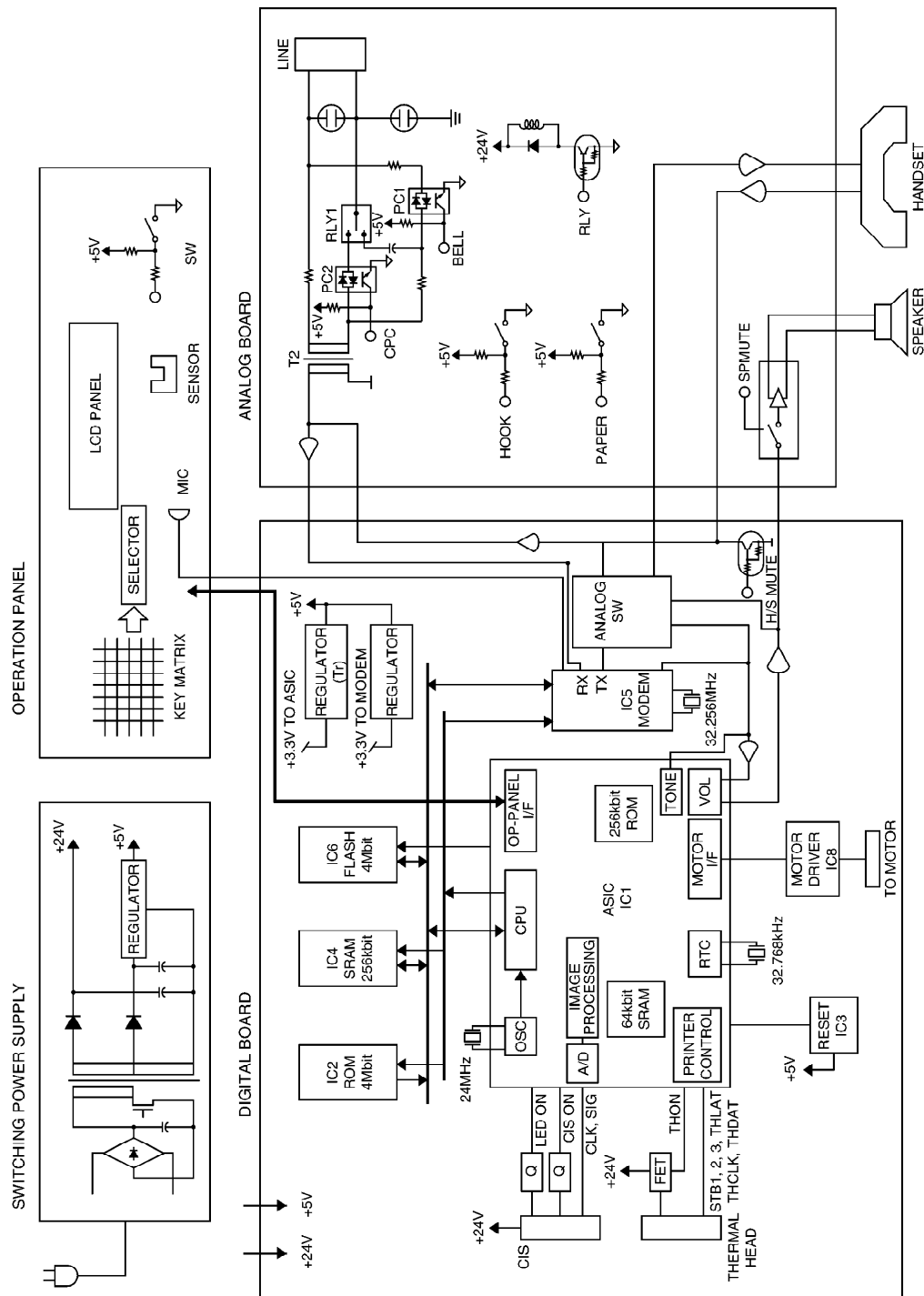
Controls the operation panel I/F.

Controls the thermal head I/F and CIS I/F.

Executes image processing.

- TAM monitor and the H/S volume.
I/O ports**
- 2. ROM (IC2)**
Contains all of the program instructions for unit operations.
 - 3. Static RAM (IC4)**
This memory is used mainly for the parameter working storage area.
 - 4. MODEM (IC5)**
Modem for the FAX.
 - 5. Read Section**
Contact Image Sensor (CIS) to read transmitting documents.
 - 6. Thermal Head**
Contains heating elements for dot matrix image printing.
 - 7. Motor driver (IC8)**
Drives the motor.
 - 8. Reset circuit (IC3)**
Detects voltage at 5V power source, outputs the signal, which provides the reset signal for each IC to IC1.
 - 9. Analog board**
Composed of an ITS circuit and NCU circuit.
 - 10. Sensor Section**
Composed of a document sensor, recording paper sensor, motor position sensors, read position sensor.
 - 11. Power supply switching board section**
Supplies +5V and +24V to the unit.
 - 12. FLASH MEMORY (IC6)**
Saves TAM voice data.

5.2.1. GENERAL BLOCK DIAGRAM



5.3. CONTROL SECTION

5.3.1. BLOCK DIAGRAM

5.3.2. ASIC (IC1)

This custom IC is used for general FAX operations.

1. CPU

This model uses a Z80 equivalent CPU operating at 8MHz. / Many

of the peripheral functions are handled by custom designed LSIs. As a result, the CPU only needs to process the result.

2. RTC

Real time clock.

3. DECODER

Decodes the address.

4. ROM/RAM I/F

Controls the SELECT signal of ROM or RAM and bank switching.

5. CIS I/F

Controls document reading.

6. IMAGE DATA RAM

This is inside the ASIC and has 8KB which is used for image processing.

7. THERMAL HEAD I/F

Transmits the recorded data to the thermal head.

8. MOTOR I/F

Controls the motor which feeds the document and feeds the reading document.

9. OPERATION PANEL I/F

Control port for Operation Panel.

10. I/O PORT

I/O Port Interface (for analog board port control).

11. ANALOG BLOCK

Electronic volume for the handset and TAM monitor. / Sends beep tones, etc.

Descriptions of Pin Distribution (IC1)

NO	SIGNAL	I/O	POWER SUPPLIED VOLTAGE	DESCRIPTION
1	AIN1	A	3.3V	CCD IMAGE SIGNAL INPUT
2	AIN2	A	3.3V	THERMISTOR TEMPERATURE WATER INPUT
3	AIN3	A	3.3V	
4	AMON	A	3.3V	ANALOG SIGNAL MONITOR TERMINAL
5	VSSB		GND	POWER SOURCE (ANALOG GND)
6	VDDDB		3.3V	POWER SOURCE (ANALOG 3.3V)
7	VDD(3.3V/B)		3.3V/BATT	POWER SOURCE (+3.3V/LITHIUM BATTERY)
8	X32OUT	O	3.3V/BATT	RTC (32.768KHz) CONNECTION
9	X32IN	I	3.3V/BATT	RTC (32.768KHz) CONNECTION
10	VSS		GND	GND
11	XBACEN	I	5V/BATT	BACKUP ENABLE
12	VDD(5V/B)		5V/BATT	POWER SOURCE (+5V/LITHIUM BATTERY)
13	XRAMCS	O	5V/BATT	RAM (IC4) CHIP SELECT
14	FTG	O	5V	SH SIGNAL OUTPUT FOR CIS (SI)
15	F1	O	5V	01SIGNAL OUTPUT FOR CIS(CLK)
16	F2/OP	O	5V	OUTPUT PORT (LED ON)
17	FR/OP	O	5V	ACK (DTMF RECEIVER CONTROL)
18	CPC	I	5V	INPUT PORT (CPC)
19	VDD(5V)		5V	POWER SOURCE (+5V)
20	VSS		5V	POWER SOURCE (GND)
21	RVN	I	5V	INPUT PORT (CISSEL)
22	IRDATXD/IOP	I	5V	INPUT PORT (JAM)
23	IRDARXD/IOP80	O	5V	OUTPUT PORT (H/S MUTE)
24	TXD/IOP	O	5V	OUTPUT PORT
25	RXD/IOP	O	5V	OUTPUT PORT (TELRXENB)
26	XRTS/IOP	O	5V	OUTPUT PORT (P-SHORT)
27	XCTS/IOP	O	5V	OUTPUT PORT (MDMTXENB)
28	MIDAT/IOP	O	5V	OUTPUT PORT (TONE1ENB)
29	MICLK/IOP	O	5V	OUTPUT PORT (TONE2ENB)
30	TONE1	A	5V	TONE OUTPUT
31	TONE2	A	5V	TONE OUTPUT
32	VOLUREF	A	5V	ANALOG REF VOLTAGE
33	VOLUOUT	A	5V	VOLUME OUTPUT
34	VOLUIN	A	5V	VOLUME INPUT
35	MILAT/IOP	O	5V	OUTPUT PORT (H/S RXENB)
36	XNMI	I	5V	HIGH FIXED
37	FMEMDO/IOP	O	5V	ALE (FLASH MEMORY CONTROL)
38	FMEMDI/IOP	O	5V	FLASH MEMORY (IC6) CHIP SELECT
39	FMEMCLK/IOP	I	5V	INPUT PORT (BELL) R/B (FLASH MEMORY CONTROL)

NO	SIGNAL	I/O	POWER SUPPLIED VOLTAGE	DESCRIPTION
40	VSS		GND	POWER SOURCE (GND)
41	VDD(5V)		5V	POWER SOURCE (+5V)
42	20KOSC/IOP	O	5V	CLE (FLASH MEMORY CONTROL)
43	XWAIT	I	5V	INPUT PORT (HOOK)
44	HSTRD/IOP	O	5V	FRD (FLASH MEMORY RD)
45	HSTWR/IOP	O	5V	FWR (FLASH MEMORY WR)
46	XOPRBE	O	5V	OUTPUT PORT (SP-MUTE)
47	ADR15	O	5V	CPU ADDRESS BUS 15 (NOT USED)
48	ADR14	O	5V	CPU ADDRESS BUS 14 (NOT USED)
49	ADR13	O	5V	CPU ADDRESS BUS 13 (NOT USED)
50	VDD(3.3V)		3.3V	POWER SOURCE (+3.3V)
51	XOUT	O	3.3V	SYSTEM CLOCK (24MHz)
52	XIN	I	3.3V	SYSTEM CLOCK (24MHz)
53	VSS		GND	POWER SOURCE (GND)
54	VDD(5V)		5V	POWER SOURCE (+5V)
55	XTEST	O	5V	24MHz CLOCK
56	TEST1	I	5V	HIGH FIXED
57	TEST2	I	5V	HIGH FIXED
58	TEST3	I	5V	HIGH FIXED
59	TEST4	I	5V	HIGH FIXED
60	XMDMINT	I	5V	MODEM INTERRUPT
61	XMDMCS	O	5V	MODEM (IC5) CHIP SELECT
62	VSS		GND	POWER SOURCE (GND)
63	VDD(3.3V)		3.3V	POWER SOURCE (+3.3V)
64	XRAS/IOP	O	5V	MODEM RESET
65	XCAS1/IOP	O	5V	SD (Serial Data from DTMF Receiver)
66	XCAS2/IOP	I	5V	INPUT PORT (BELL)
67	XRESCS2	O	5V	OPRESET
68	DB3	I/O	5V	CPU DATA BUS 3
69	DB2	I/O	5V	CPU DATA BUS 2
70	DB4	I/O	5V	CPU DATA BUS 4
71	DB1	I/O	5V	CPU DATA BUS 1
72	DB5	I/O	5V	CPU DATA BUS 5
73	DB0	I/O	5V	CPU DATA BUS 0
74	DB6	I/O	5V	CPU DATA BUS 6
75	VSS		GND	POWER SOURCE (GND)
76	VDD (3.3V)		3.3V	POWER SOURCE (+3.3V)
77	DB7	I/O	5V	CPU DATA BUS 7
78	XROMCS	I/O	5V	ROM (IC2) CHIP SELECT
79	RD	O	5V	CPU RD
80	WR	O	5V	CPU WR
81	VSS		GND	POWER SOURCE (GND)
82	VDD (5V)		5V	POWER SOURCE (+5V)

NO	SIGNAL	I/O	POWER SUPPLIED VOLTAGE	DESCRIPTION
83	ADR0	O	5V	CPU ADDRESS BUS 0
84	ADR1	O	5V	CPU ADDRESS BUS 1
85	ADR2	O	5V	CPU ADDRESS BUS 2
86	ADR3	O	5V	CPU ADDRESS BUS 3
87	ADR4	O	5V	CPU ADDRESS BUS 4
88	ADR5	O	5V	CPU ADDRESS BUS 5
89	ADR6	O	5V	CPU ADDRESS BUS 6
90	ADR7	O	5V	CPU ADDRESS BUS 7
91	ADR8	O	5V	CPU ADDRESS BUS 8
92	ADR9	O	5V	CPU ADDRESS 9
93	ADR10	O	5V	CPU ADDRESS 10
94	ADR11	O	5V	CPU ADDRESS 11
95	ADR12	O	5V	CPU ADDRESS 12
96	VSS		GND	POWER SOURCE (GND)
97	VDD (5V)		5V	POWER SOURCE (+5V)
98	RBA0	O	5V	ROM/RAM BANK ADDRESS 0
99	RBA1	O	5V	ROM/RAM BANK ADDRESS 1
100	RBA2	O	5V	ROM/RAM BANK ADDRESS 2
101	RBA3	O	5V	ROM/RAM BANK ADDRESS 3
102	RBA4	O	5V	ROM/RAM BANK ADDRESS 4
103	RBA5	O	5V	ROM/RAM BANK ADDRESS 5
104	RBA6/IOP96	I	5V	INPUT PORT (PAPER)
105	STB1	O	5V	STROBE SIGNAL OUTPUT TO THER HEAD
106	STB2	O	5V	STROBE SIGNAL OUTPUT TO THER HEAD
107	STB3	O	5V	STROBE SIGNAL OUTPUT TO THER HEAD
108	XRESET	I	5V	RESET INPUT
109	XORESET	O	5V	RESET OUTPUT
110	VDD (5V)		5V	POWER SOURCE (+5V)
111	VSS		GND	POWER SOURCE (GND)
112	XRESET1	I	5V	RESET INPUT
113	WDERR	O	5V	WATCHED ERROR OUTPUT SIGNAL
114	THDAT	O	5V	RECORDED IMAGE OUTPUT
115	THCLK	O	5V	CLOCK OUTPUT FOR DATA TRANS
116	VDD (3.3V)		3.3V	POWER SOURCE (3.3V)
117	VSS		GND	POWER SOURCE (GND)
118	THLAT	O	5V	PULSE OUTPUT FOR DATA LATCH
119	STBNP	I	5V	INPUT PORT (MOTOR POS.)
120	RM0/IOP	O	5V	MOTOR CONTROL (D)
121	RM1/IOP	O	5V	MOTOR CONTROL (C)
122	RM2/IOP	O	5V	MOTOR CONTROL (B)

NO	SIGNAL	I/O	POWER SUPPLIED VOLTAGE	DESCRIPTION
123	RM3/IOP	O	5V	MOTOR CONTROL (A)
124	RXE/IOP	O	5V	MOTOR ENABLE SIGNAL
125	TMO	O	5V	OUTPUT PORT (THON)
126	VDD (5V)		5V	POWER SOURCE (+5V)
127	VSS		GND	POWER SOURCE (GND)
128	TM1/IOP	I	5V	OUTPUT PORT
129	TM2/IOP	I	5V	INPUT PORT (CIS ON)
130	TM3/IOP	O	5V	OUTPUT PORT (RLY)
131	TXE/IOP	I	5V	INPUT PORT (CUT. POS.)
132	KSTART	O	5V	OPERATION PANEL CONTROL
133	KLATCH	O	5V	OPERATION PANEL CONTROL
134	KSCLK	O	5V	OPERATION PANEL CONTROL
135	KTXD	O	5V	OPERATION PANEL CONTROL
136	KRXD	I	5V	OPERATION PANEL CONTROL
137	ADSEL1	O	5V	CHANNEL SELECT SIGNAL FOR AIM
138	VSSC		GND	POWER SOURCE (ANALOG GND)
139	VDDC		3.3V	POWER SOURCE (ANALOG +3.3V)
140	VSSA		GND	POWER SOURCE (ANALOG GND)
141	VDDA		3.3V	POWER SOURCE (ANALOG +3.3V)
142	VREFB	A	3.3V	A/D CONVERTER'S ZERO STANDARD VOLTAGE OUTPUT
143	VCL	A	3.3V	ANALOG PART STANDARD VOLTAGE SIGNAL
144	VREFT	A	3.3V	A/D CONVERTER'S FULL SCALE VOLTAGE OUTPUT

5.3.3. ROM (IC2)

This 512 KB ROM (OTPROM or MASKROM) has 32 KB of common area and bank area (BK4~BK 63). / The capacity of each bank is 8 KB. / The addresses of the common area are from 0000H to 7FFFH, and addresses 8000H to 9FFFH are for the bank area.

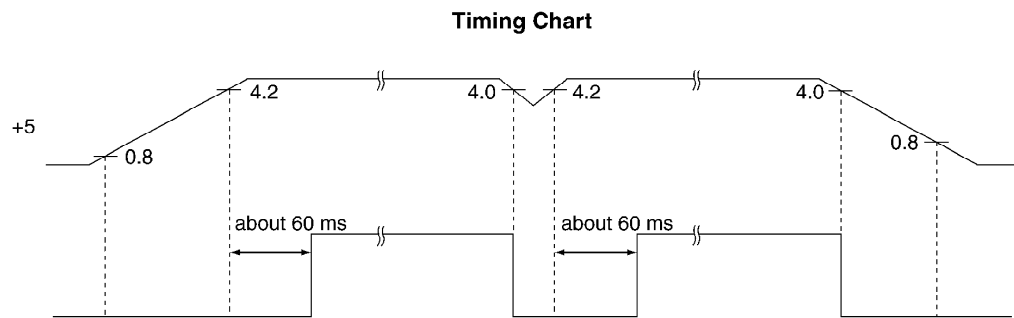
5.3.4. RAM (IC4)

This 32 KB RAM has 8 KB of common area and bank area (BK0, BK1). / The capacity of each bank is 12 KB. / The addresses of the common area are from D000H to EFFFH, and addresses A000H to CFFFH are for the bank area.

5.3.5. RESET CIRCUIT

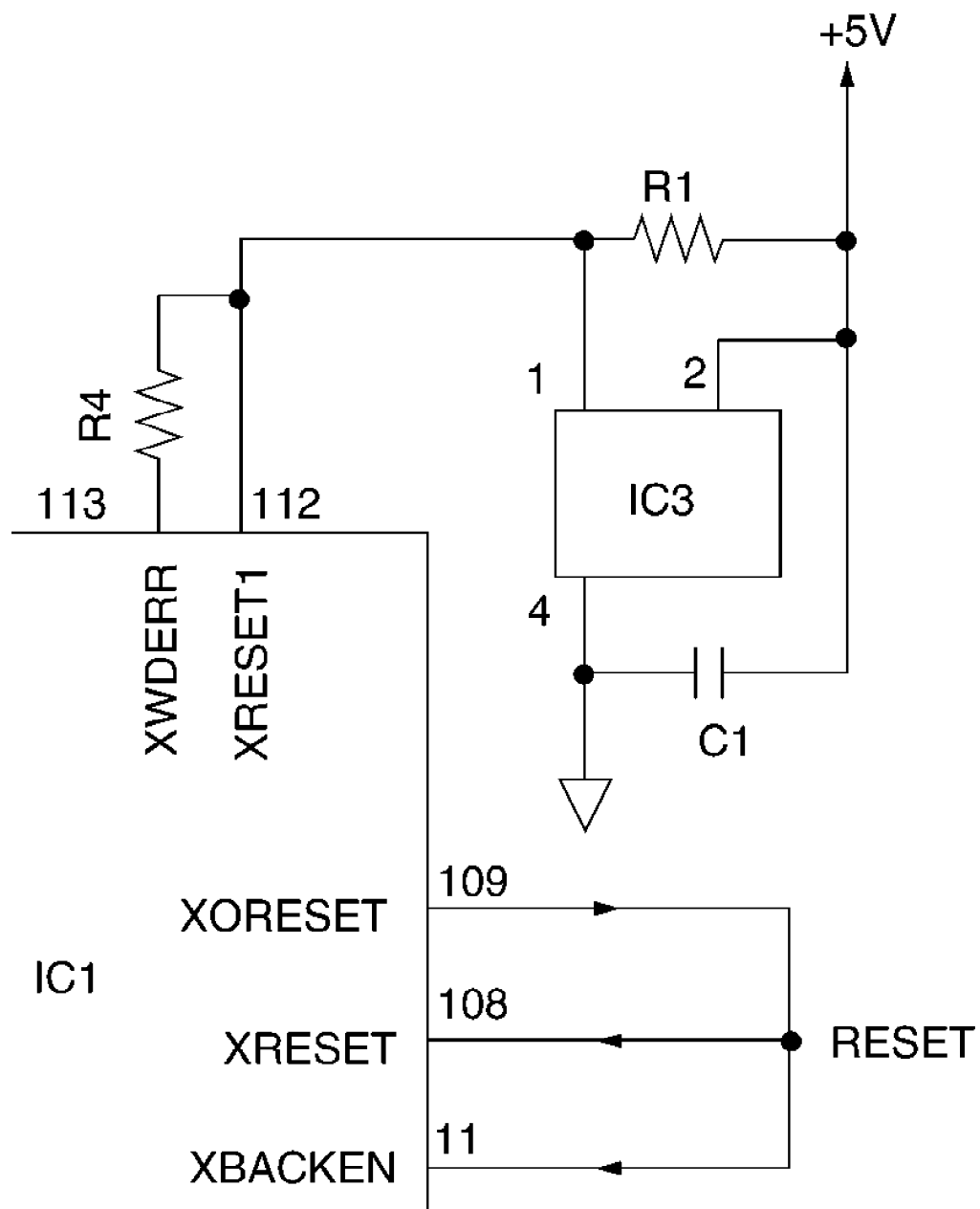
The output from pin 1 of the Reset IC (IC3) resets the gate array (IC1).

1. During a power surge, a positive reset pulse of 50 msec or more is generated and the system is reset completely. / This is done to prevent partial resetting and system runaway during a power fluctuation.



- 2. When pin 1 of IC3 becomes low, it will prohibit the RAM (IC4) from changing data. / The RAM (IC4) will go into the backup mode, when it is backed up by a lithium battery.**

Circuit Diagram



3. The watch dog timer, built-in the gate array (IC1), is initialized about every 1.5 ms. / When a watch dog error occurs, pin 113 of the gate array (IC1) becomes low. / The terminal of the WDERR signal is connected to the reset line so the WDERR signal works as the reset signal.

5.3.6. SRAM and RTC BACK UP CIRCUIT

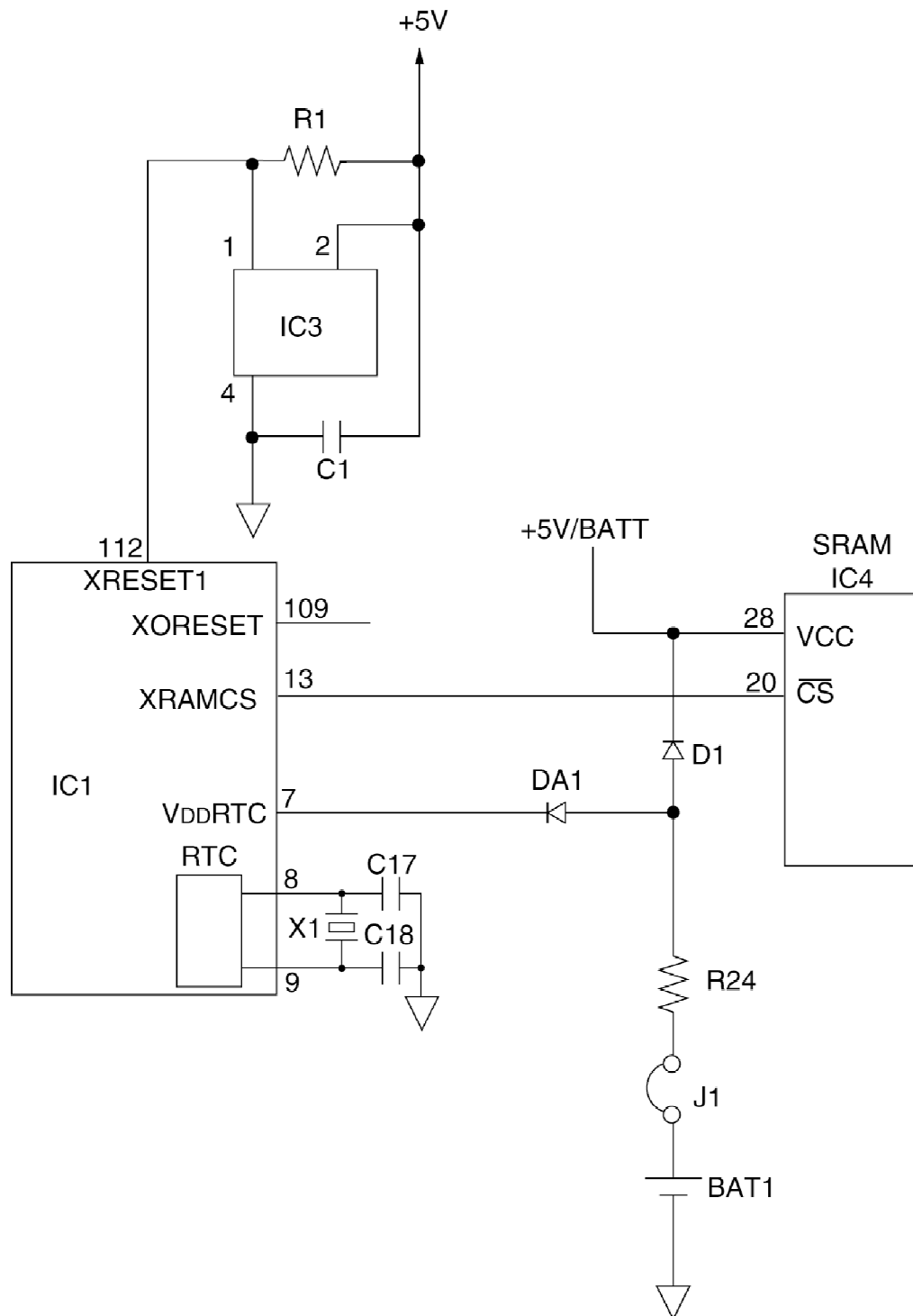
1. Function

This unit has a lithium battery (BAT1) which works for the RAM (IC4) and Real Time Clock (RTC, Integrated into ASIC:IC1). / The user parameter for auto dial numbers, the transmission ID, the system setup date and so on are stored in the RAM (IC4). / The RTC continues functioning, even when the power switch is OFF, backed up by a lithium battery.

2. Circuit Operation

When the power is turned ON, power is supplied RAM (IC4) and RTC (IC1). / At this time, the voltage at pin 28 of RAM is +5V and pin 7 of RTC (IC1) is +3.3V. When the power is turned OFF, the battery supplies the power to RAM and RTC through J1, R24, D1 or DA1. At that time, the voltage at pin 28 of RAM and pin 7 of IC1 are about +2.5V. When the power is OFF and the +5V and +3.3V voltages decrease, IC3 detects them and LOW is input to pin 112 of IC1. Pin 109 of IC1 outputs the reset signals. Pin 28 of RAM (IC4) and pin 11 of IC1 become low, then RAM and RTC (IC1) go into the back up mode, when the power consumption is lower.

Circuit Diagram



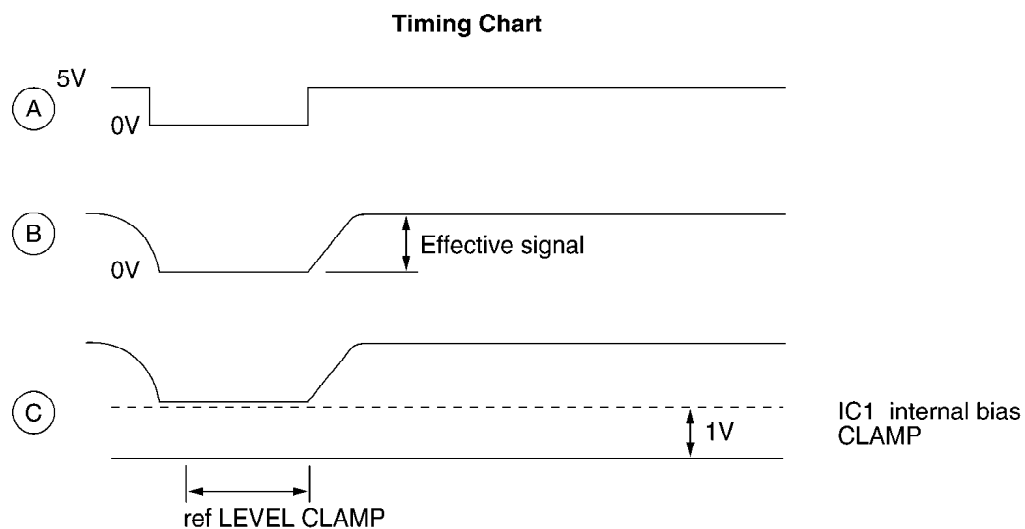
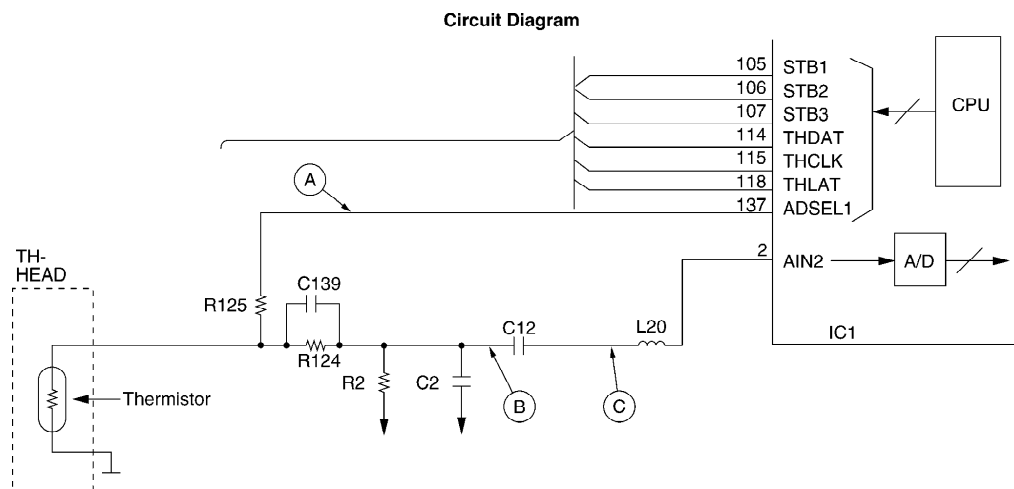
5.3.7. SUPERVISION CIRCUIT FOR THE THERMAL HEAD TEMPERATURE

1. Function

The thermistor changes the resistor according to the temperature and uses the thermistor's characteristics. / The output of pin 137

of IC1 becomes a low level. / Then when it becomes a high level, it triggers point (A). / In point (C), according to the voltage output time, the thermal head's temperature is detected.

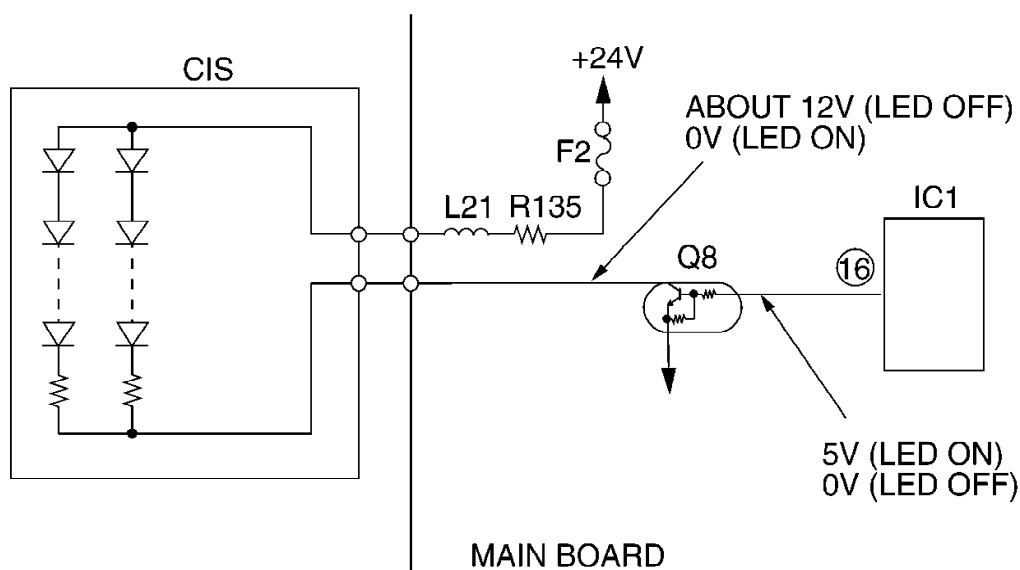
After the thermal head temperature is converted to voltage in (B), it is then changed to digital data in the A/D converter inside IC1. The CPU decides the strobe width of the thermal head according to this value. Therefore, this circuit can keep the thermal head at an even temperature in order to stabilize the printing density and prevent the head from being overheated.



5.3.8. LED ARRAY(CIS)

The LED ARRAY will light during transmission and copying as a light source to recognize document characters, patterns, or graphics on a document. / It is also possible to light the LED ARRAY in the test mode.

Circuit Diagram



5.4. FACSIMILE SECTION

5.4.1. IMAGE DATA FLOW DURING FACSIMILE OPERATION

COPY (Fine, Super-Fine, Half Tone)

1. Line information is read by CIS, via route (1), and is input to IC1.
2. In IC1, the data is adjusted to a suitable level for A/D conversion in the Analog Signal Processing Section, and via route (2) it is input to A/D conversion (8 bit). After finishing A/D conversion, the data is input to the Image Processing Section via route (3). Then via routes (4) and (5), it is stored in RAM as shading data.
3. The draft's information that is read by CIS is input to IC1 via route (1). After it is adjusted to a suitable level for A/D conversion via route (2), the draft's information is converted to A/D (8 bit), and it is input to the Image Processing Section. / The other side, the shading data which flows from RAM via routes (6) and (7), is input to the Image Processing Section. / After finishing the draft's information image processing, white is regarded as "0" and black is regarded as "1". / Then via routes (4) and (5), they are stored in RAM.
4. The white/black data stored as above is input to the P/S converter via routes (6) and (8). / The white/black data converted to serial data in the P/S converter is input to the Thermal Head via route (9)

and is printed out on recording paper.

Note:

Standard: Reads 3.85 times/mm

Fine: Reads 7.7 times/mm

Super-Fine: Reads 15.4 times/mm

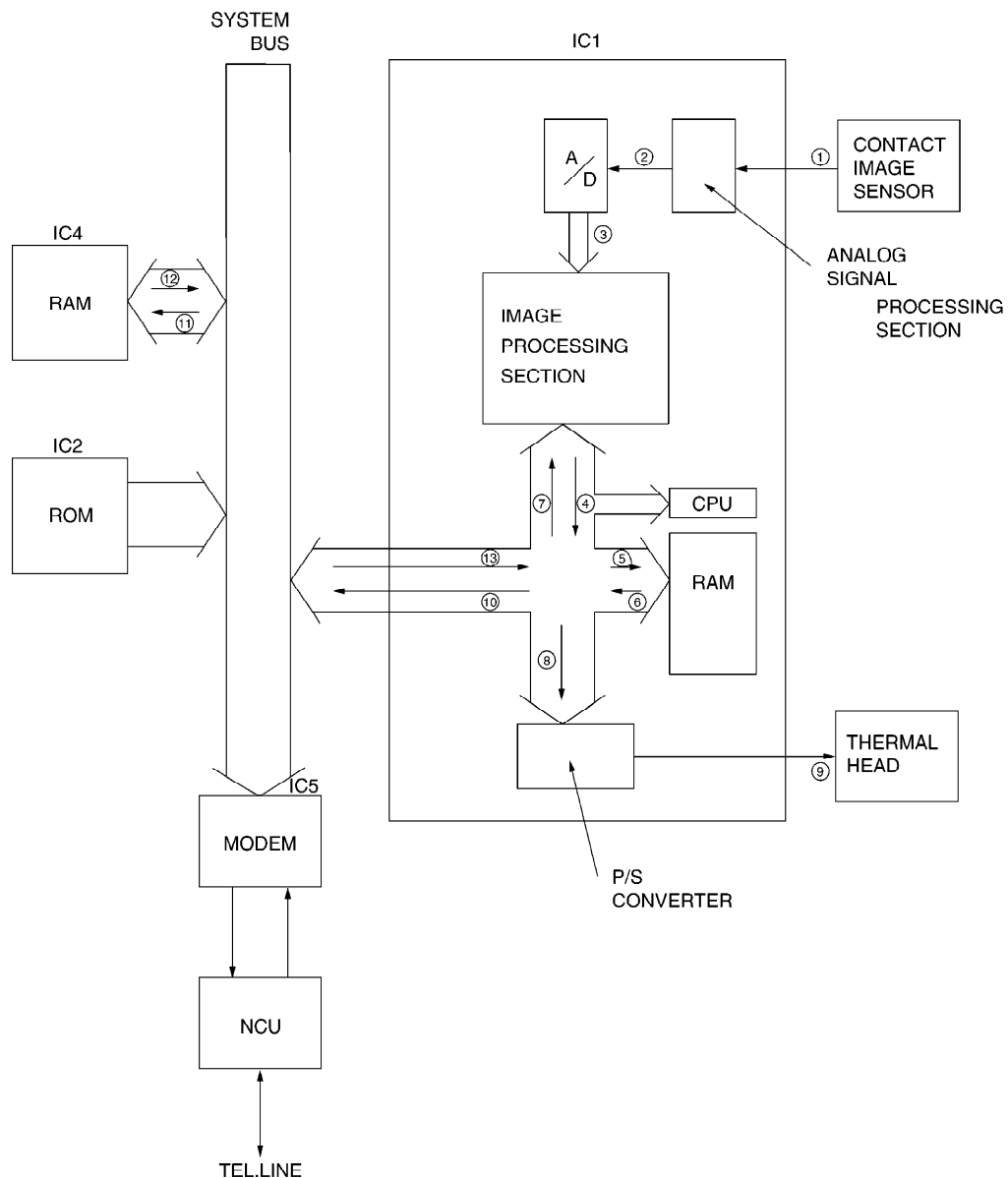
Transmission

- 1. Same processing as COPY items 1) - 3).**
- 2. The data stored in RAM of IC1 is output from IC1 via routes (6) and (10), and is stored in the system bus. / Via route (11), it is stored in the communication buffer inside RAM (IC4).**
- 3. While fetching data stored in the communication buffer synchronous with the modem, the CPU inputs data to the modem along route (12). / It is converted to serial analog data and forwarded over telephone lines via the NCU Section.**

Reception

- 1. The serial analog image data is received over telephone lines and input to the modem IC (IC5) via the NCU section, where it is demodulated to parallel digital data. The balance data is sent to the modem. Then the CPU stores the data in the communication buffer of RAM (IC4) along route (11).**
- 2. The data stored in RAM (IC4) is decoded by the CPU via route (12), and is stored in RAM by routes (13) and (5).**
- 3. Same processing as COPY item 4).**

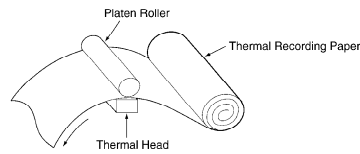
5.4.2. BLOCK DIAGRAM



5.4.3. THERMAL HEAD

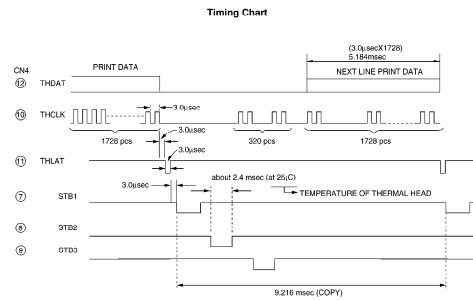
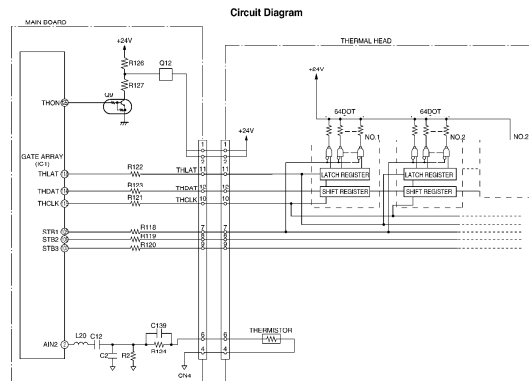
1. Function

This unit utilizes state of the art thermal printer technology. / The recording paper (roll paper) is chemically processed. When the thermal head contacts this paper it emits heat momentarily, and black dots (appearing like points) are printed on the paper. If this continues, letters and/or diagrams appear, and the original document is reproduced.



2. Circuit Operation

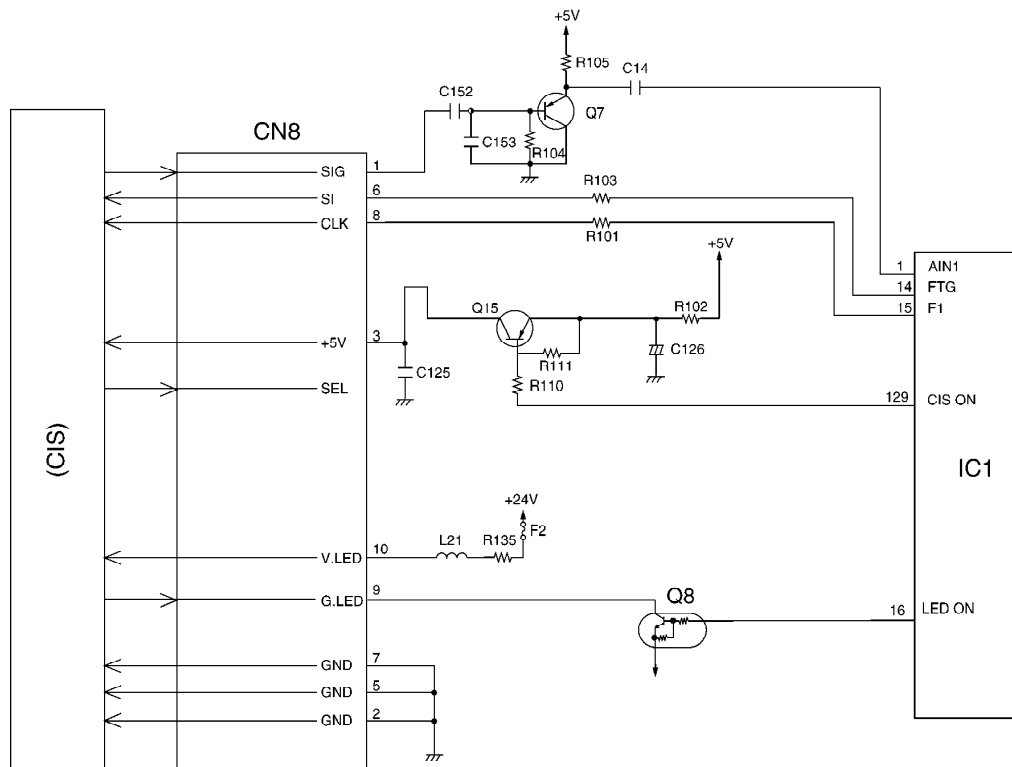
There are 27 driver ICs aligned horizontally on the thermal head and each one of these ICs can drive 64 heat emitting registers. This means that one line is at a density of $64 \times 27 = 1728$ dots=(8 dots/mm). / White/Black (white=0, black=1) data in one line increments is synchronized at IC1 pin 115 (THCLK), and sent from IC1 pin 114 (THDAT) to the shift register of the ICs. The shift registers of the 27 ICs are connected in series, and upon the shift of dot increment 1728, all the shift registers become filled with data, and a latch pulse is emitted to each IC from IC1 pin 118 (THLAT). With this latch pulse, all the contents of the shift registers are latched to the latch registers. Thereafter, through the addition of strobes from the IC1 pins (105 - 107) only black dot locations (=1) among latched data activates the driver, and the current passes to heat the emitting body causing heat emission. / Here, the three line strobes, STB1 to STB3, impress at intervals of 9.216 msec, as required for one-line printout. / The sequence is shown on the next page. [Moreover, for the strobe width, the thermistor value inside the thermal head is detected according to IC1 pin 2. (See **BLOCK DIAGRAM** ().) Depending on that value, the strobe width is recorded in ROM (IC2). / Accordingly, the strobe width is determined. / When the thermal head is not used, the IC1 (125, THON) becomes low, Q9 turns OFF, Q12 turns OFF, and the + 24 V power supply for the thermal head driver is not impressed to protect the IC.



5.4.4. SCANNING BLOCK

The scanning block of this device consists of a control circuit and a contact image sensor made up of a celfoc lens array, an LED array, and photoelectric conversion elements.

Circuit Diagram



When an original is inserted and the start button pressed, pin 16 of IC1 goes to a high level and the transistor Q8 turns on and pin 129 of IC1 goes to a low level and the transistor Q15 turns on.

This applies voltage to the LED array to light it and the voltage (+5v) of CIS turns on. The contact image sensor is driven by each of the FTG-F1 signals output from IC1, and the original image illuminated by the LED array undergoes photoelectric conversion to output an analog image signal. The analog image signal is input to the system LSI (IC1) on AIN1 (pin 1 of IC1) and converted into 8-bit data by the A/D converter inside IC1. Then this signal undergoes digital processing in order to obtain a high-quality image.

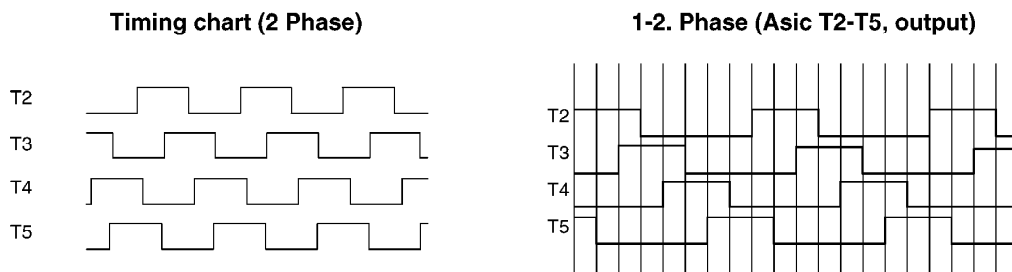
5.4.5. STEPPING MOTOR DRIVE CIRCUIT

1. Function

One individual stepping motor is used for transmission and reception. It feeds the document or recording paper synchronized for reading or printing.

2. Circuit Operation

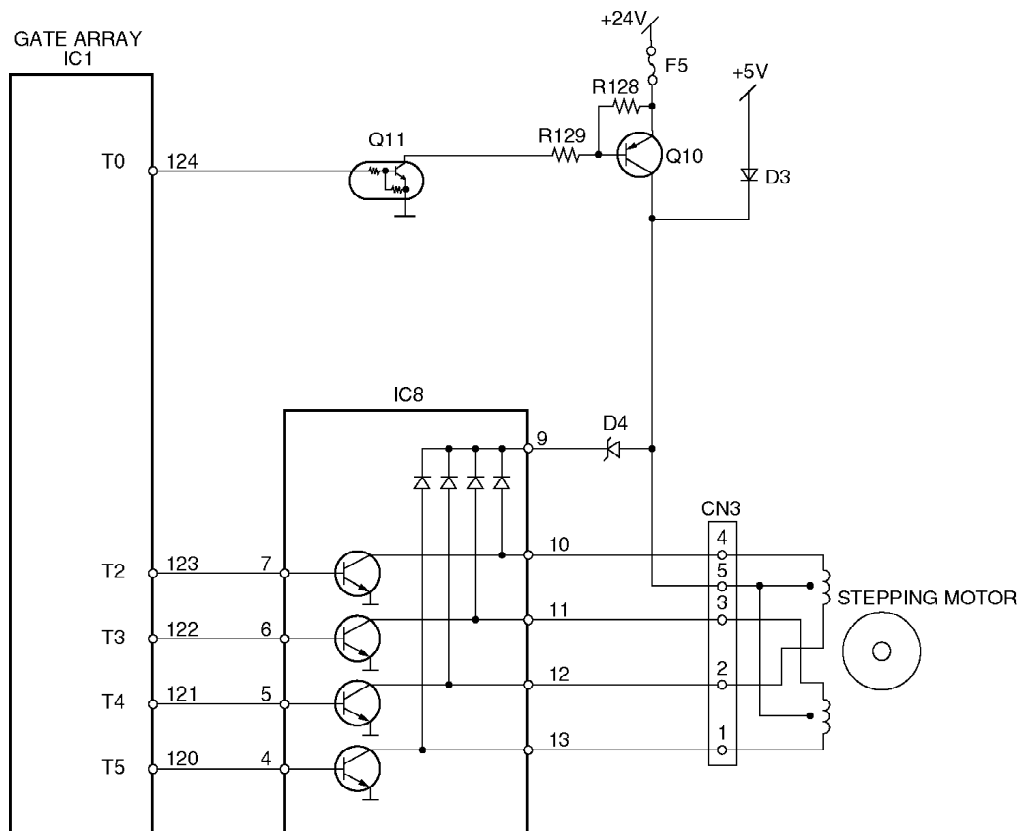
During motor drive, gate array IC1 pin 124 becomes a high level, and Q11 and Q10 go ON as a result. +24 V is supplied to the motor coil. / Stepping pulses are output from gate array IC1, causing driver IC8 to go ON. The motor coil is energized sequentially in 2 phase increments or 1-2 phase increments, which causes a 1-step rotation. A 1-step rotation is 0.13mm of recording paper or document paper. The timing chart is below.



Stepping Motor Phase Pattern

Function	Mode	Phase Pattern	Speed
Copy	Fine/Half Tone	1-2	432 pps
	Super Fine	1-2	216 pps
FAX	STD	2	432 pps
	Fine/Half Tone	1-2	432 pps
	Super Fine	1-2	216 pps
——	Paper Feed	2	432 pps

Circuit Diagram



When the motor is OFF, gate array IC1 pin 124 becomes a low level and Q11 and Q10 also turns OFF. Instead of +24V, +5V is supplied through D3 so that the motor is held in place.

5.4.6. GEAR SECTION

This section shows how the motor-driven gear mechanism works in the main operations: FAX transmission, FAX reception the motor and copying.

5.4.6.1. MODE SELECTION

When the motor attached to the Drive Motor Gear rotates counterclockwise (CCW), Swing Gear A engages the CAM and the CAM turns counterclockwise to select a mode. (See Fig. A.) There are three mode options controlled by the Switch: A: Transmit mode, B: Receive mode and C: Copy mode. In Fig. B, you can see which mode is selected by the position of the rib in the CAM.

5.4.6.2. MODE OPERATION

Once a mode is selected, the Drive Motor Gear rotates clockwise (CW) and then the Swing Gear A-1 controls the mode operation.

A: Transmit mode

Swing Gear A-1 engages G6 and conveys its drive power to the Separation Roller Gear for pre-feeding documents.

B: Receive mode

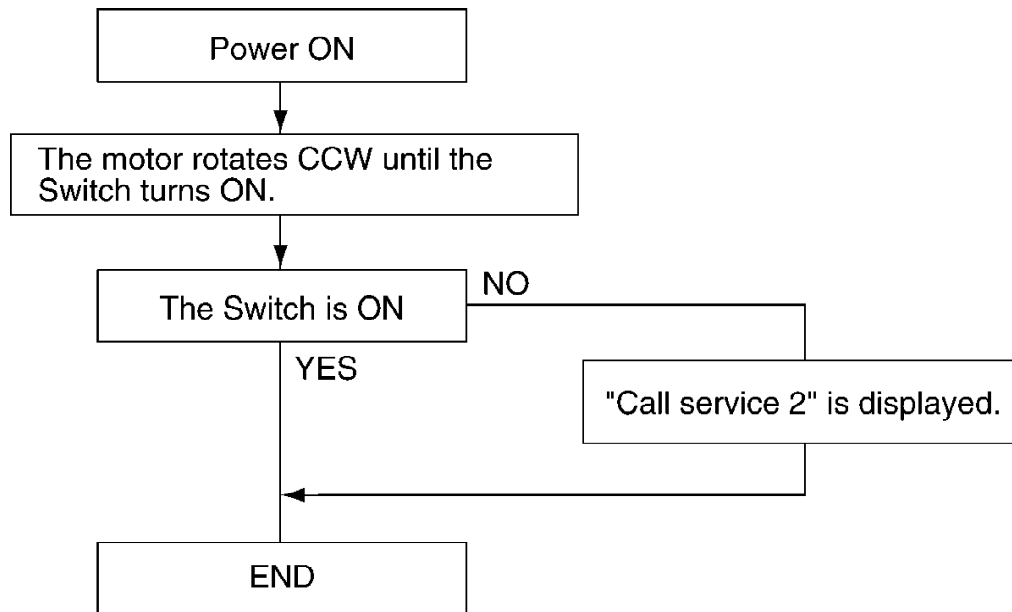
Swing Gear B engages G8 and conveys its drive power to the Platen Roller Gear for printing the received data.

C: Copy mode

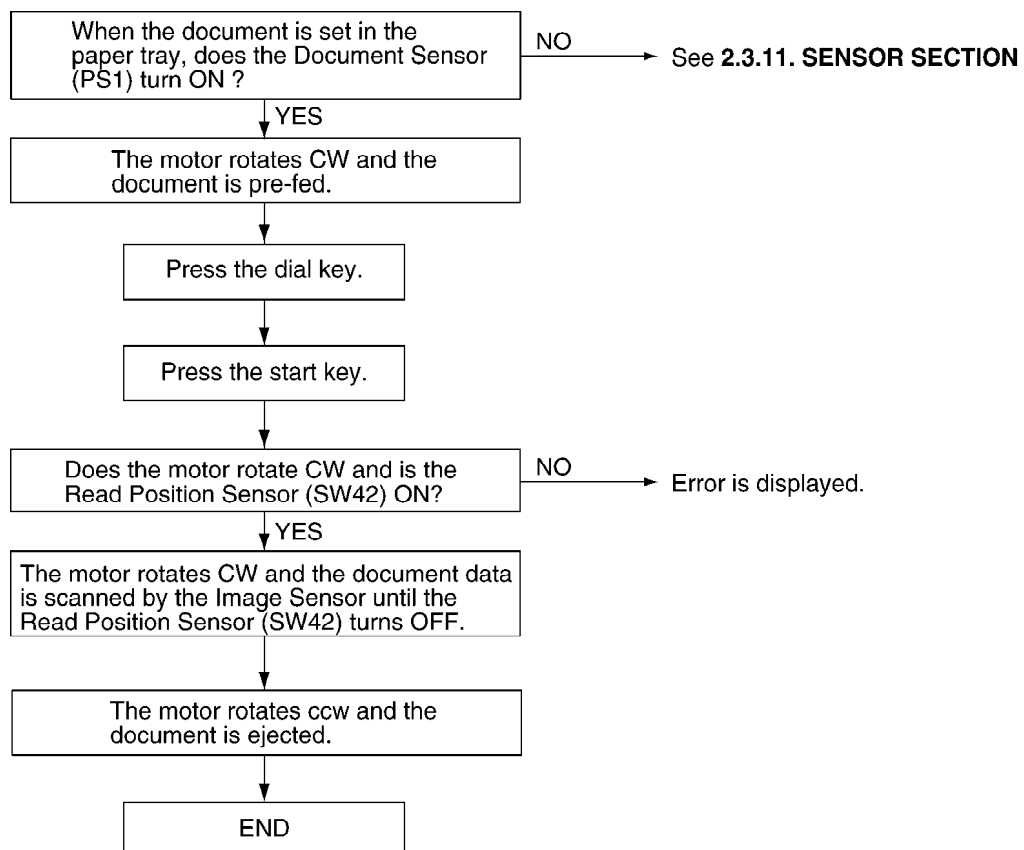
Swing Gear A-1 and B engage Gears 6 and 8 respectively and drive both the Separation Roller Gear and the Platen Roller Gear for feeding documents and recording paper in the copying operation.

5.4.6.3. MECHANICAL MOVEMENTS IN THE MAIN OPERATIONS

5.4.6.3.1. IDLE STATUS

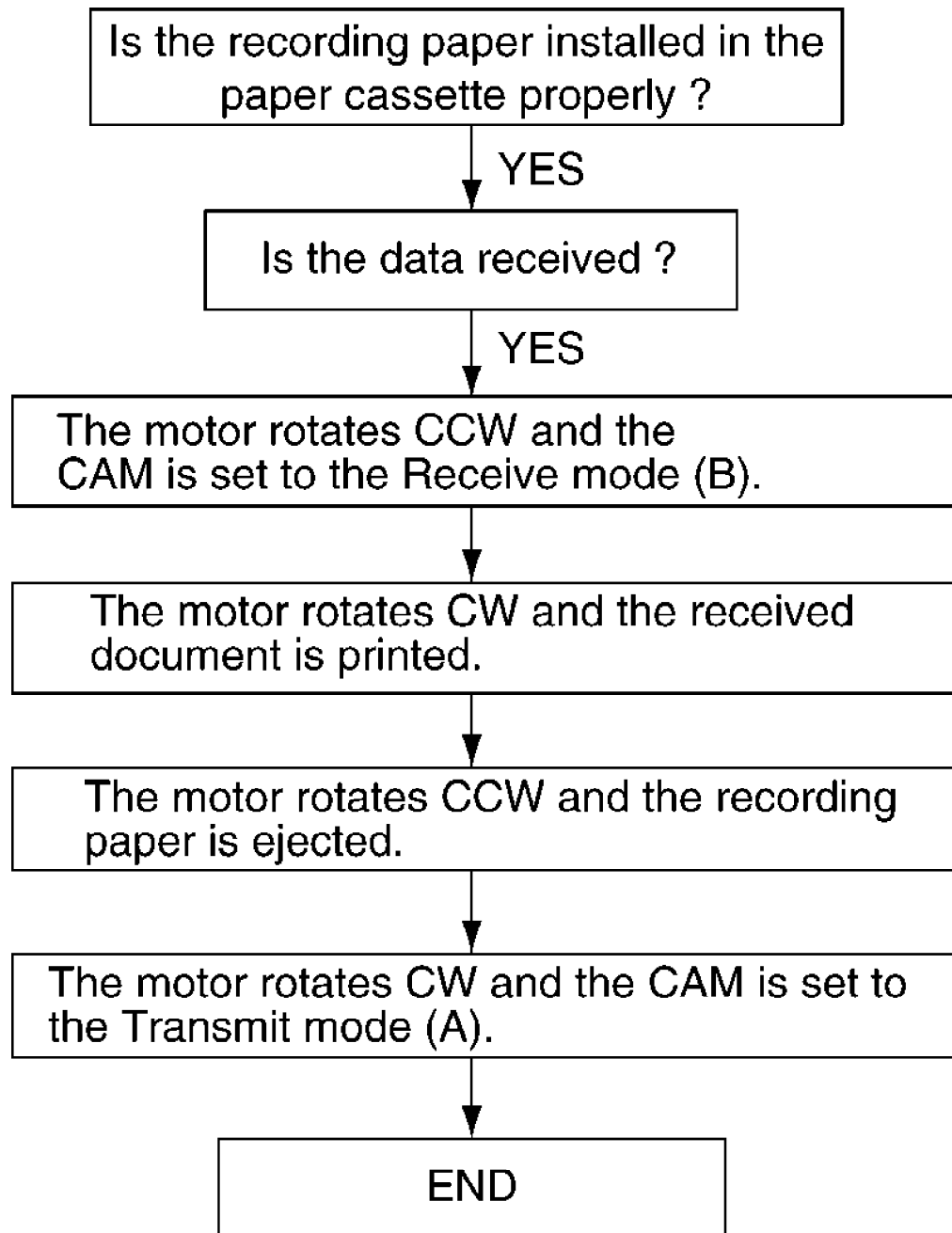


5.4.6.3.2. SCANNING



CROSS REFERENCE:
SENSOR SECTION ()

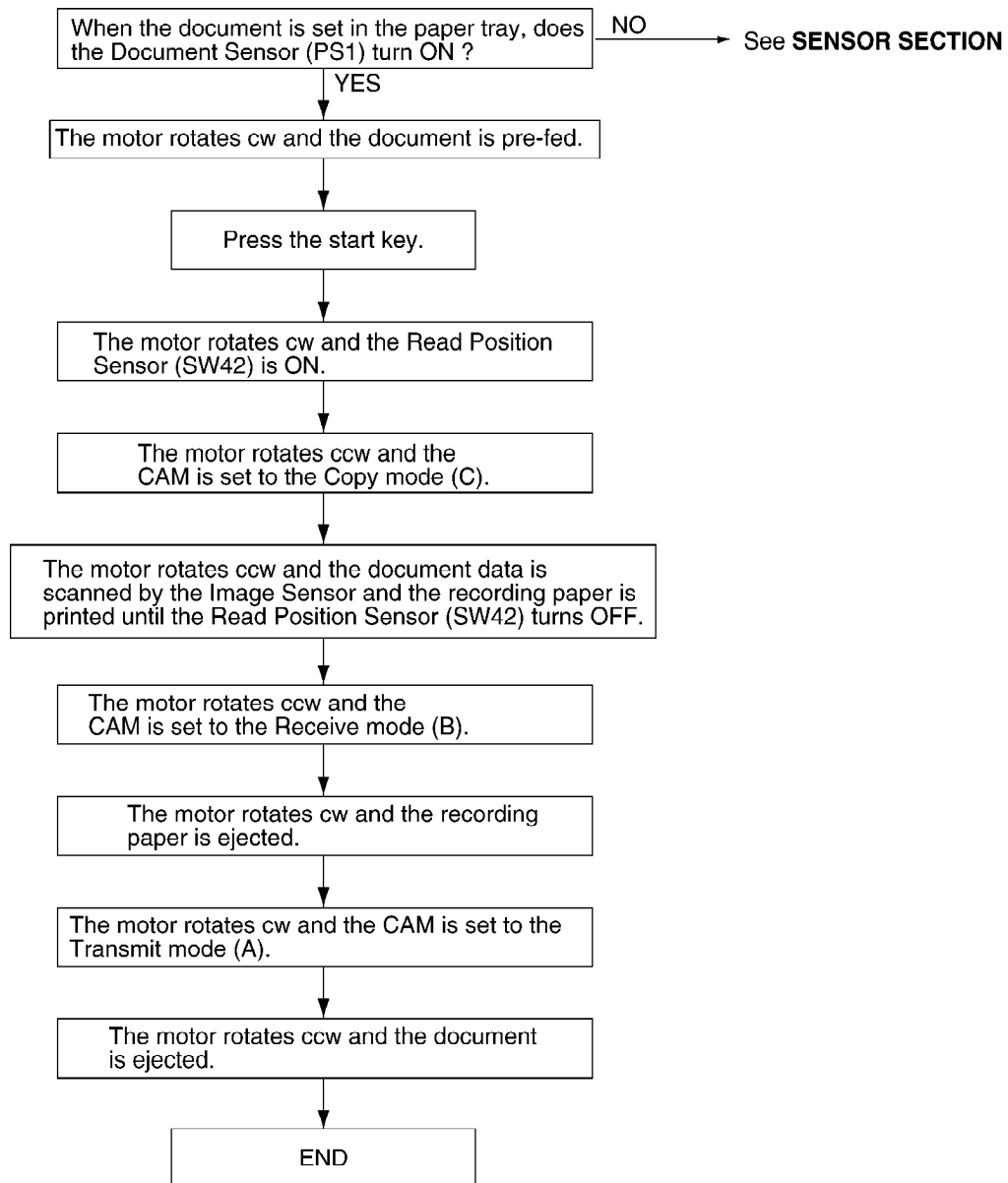
5.4.6.3.3. PRINTING



Note:

See 6.5. SENSERS AND SWITCHES.

5.4.6.3.4. COPYING



CROSS REFERENCE:

SENSOR SECTION ()

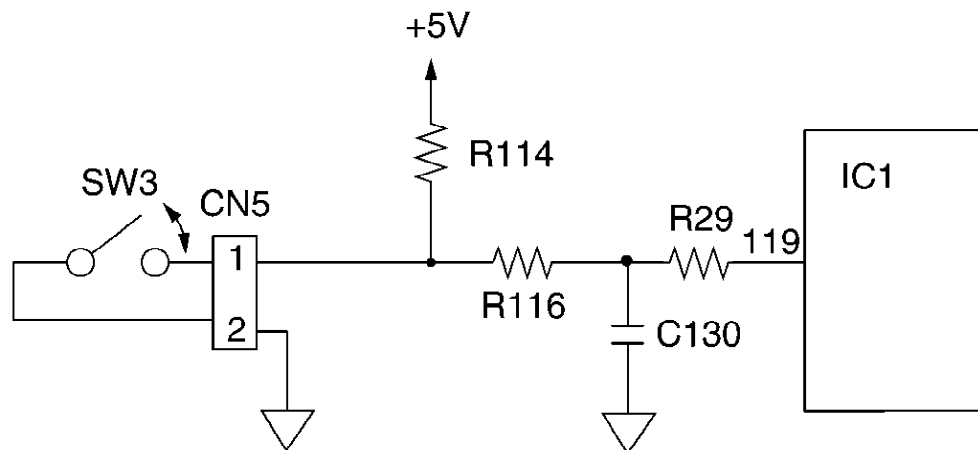
5.5. SENSORS AND SWITCHES

All of the sensor and switches are shown below.

Sensor Circuit Location	Sensor	Sensor or Switch Name	Message Error
DIGITAL	SW1	Motor Position	[CALL SERVICE 2] (LLAME SERVICIO 2)
	SW2	Cotter Position	[PAPER JAMED]
ANALOG	SW1	Cover Open and Paper set	[CHECK COVER] and [OUT OF PAPER] (REVISAR LA TAPA) and (SIN PAPEL)
	SW2	Hook SW	_____
	SW3	JAM set	[PAPER JAMED] (PAPEL ATAS CADO)
Operation Panel	SW32	Document Read Position	[REMOVE DOCUMENT] (REMOVER DOC)
	PS1	Document set	[CHECK DOCUMENT] (REVISAR DOC)

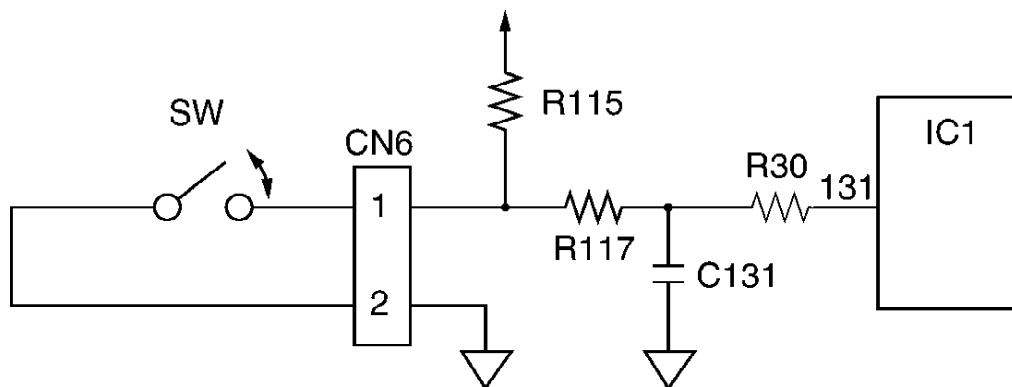
5.5.1. MOTOR POSITION SENSOR

This sensor is a detection switch for recording the position of the CAM.



Digital Board	
	Signal (IC1-119 Pin)
Home position	Low level
Other	High level

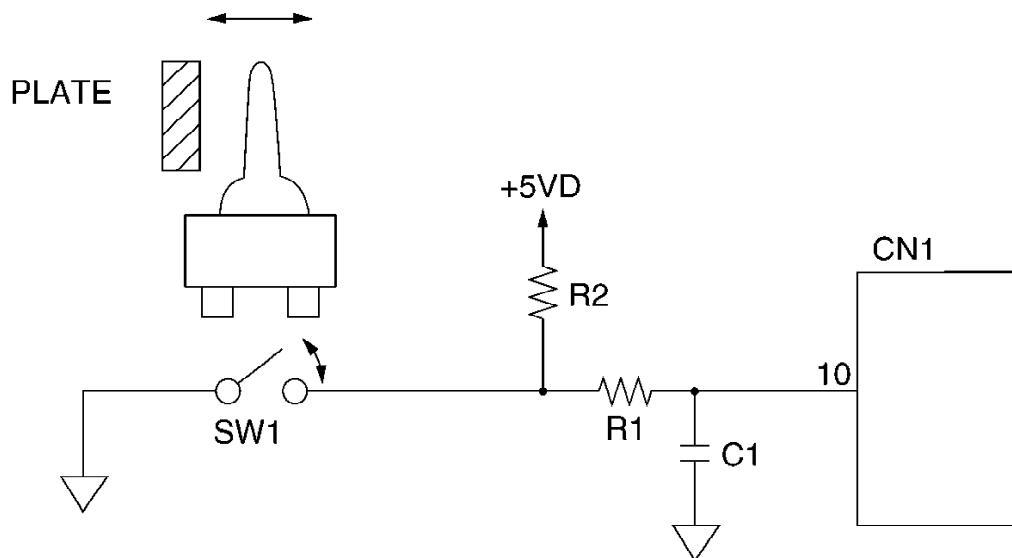
5.5.2. CUTTER POSITION SENSOR



Digital Board	
	Signal (IC1-131 Pin)
Home position	Low level
Other	High level

5.5.3. RECORDING PAPER SENSOR (SW1)

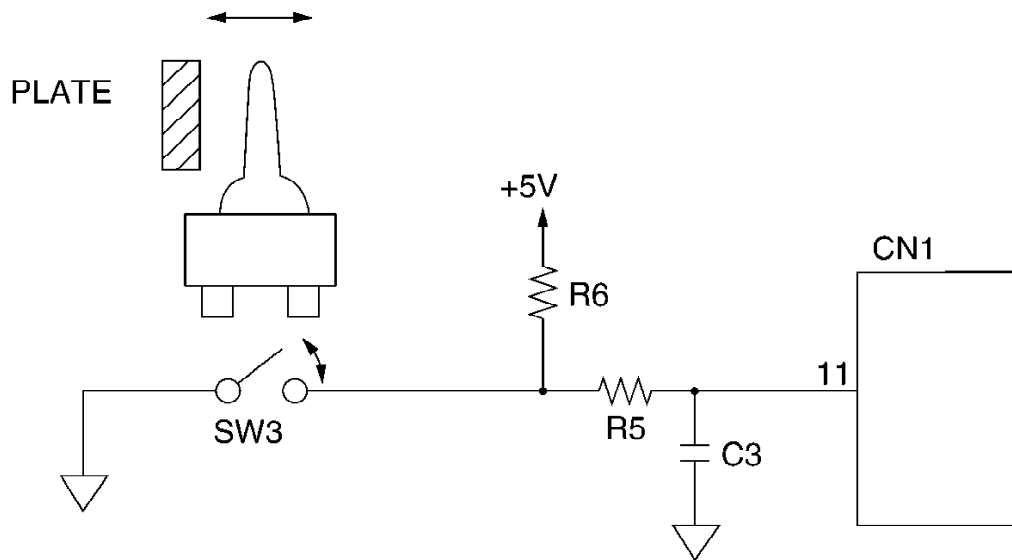
When there is no recording paper, the plate is separated from the switch lever and the switch turns off. Pin 10 of CN1 (Analog board) becomes a high level. When there is recording paper, the plate pushes the switch lever and the switch turns ON. Pin 10 of CN1 (Analog board) becomes a low level.



Analog Board	
	Signal (CN1-10 Pin)
Paper	Low level
No paper	High level

5.5.4. JAM SENSOR (SW3)

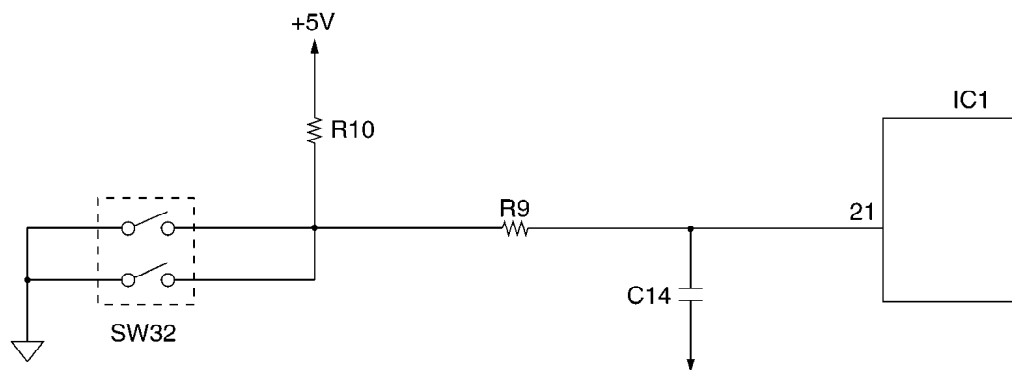
The JAM sensor is a detection switch for determining whether the recording paper edge is in the correct position or not. If the recording paper cannot be detected correctly at the JAM sensor position even when recording paper is present, then JAM is displayed. If the recording paper is at the sensor position, then the switch turns on the CN1-11pin (Analog) switches to a high level.



Analog Board	
	Signal (CN1-11 Pin)
Paper	Low level
No paper	High level

5.5.5. DOCUMENT TOP SW (SW32)

When a document is brought to the read position, the SW becomes ON, and the input signal of IC1-21pin (Operation) becomes a low level. When there is no document at the read position, the SW becomes OFF, and the input signal of IC1-21 pin (Operation) becomes a high level.

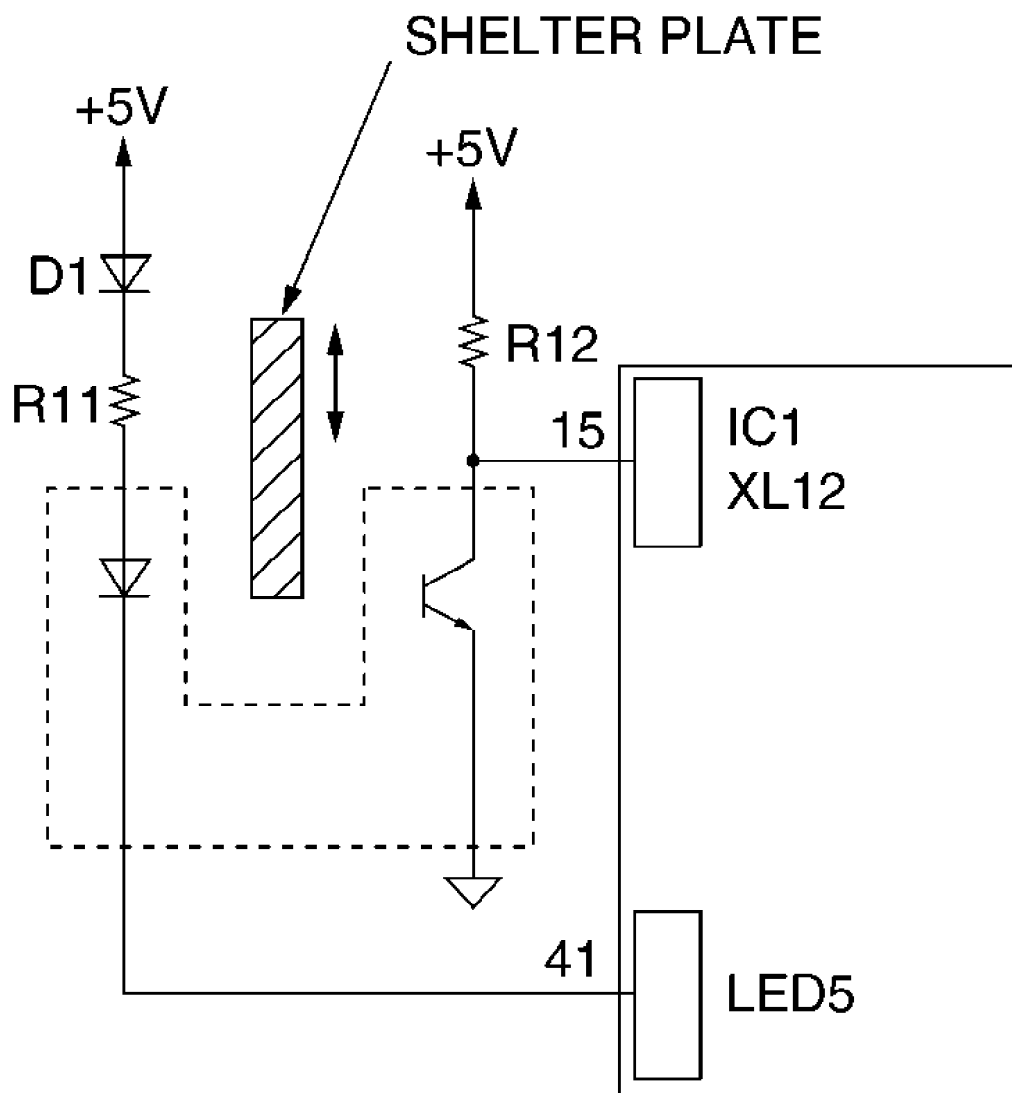


Operation Board	
	Signal (IC1-21 pin)
Out of the Read Position	High level
At the Read Position	Low level

5.5.6. DOCUMENT SET SENSOR (PS1)

When a document is set, the shelter plate closes the sensor light, the photo transistor becomes OFF, and the input signal of the IC1-15 pin (Operation) becomes a high level. When there is no

document, the shelter plate passes the sensor light, the photo transistor becomes ON, and the input signal of the IC1-15 pin (Operation) becomes a low level. (When checking this sensor, the IC1-41 pin becomes a low level.)



Operation Board		
	Photo transistor	Signal (IC1-15 Pin)
No document	ON	Low level
Set document	OFF	High level

5.6. MODEM SECTION

5.6.1. FUNCTION

The unit uses a 1 chip modem (IC5), enabling it to act as an interface between the control section for FAX sending and receiving, and the telephone line. During a sending operation, the digital image signals are modulated and sent to the telephone line. During a receiving operation, the analog image signals which are received via the telephone line are demodulated and

converted into digital image signals. The communication format and procedures for FAX communication are standardized by ITU-T. This 1 chip modem (IC5) has hardware which sends and detects all of the necessary signals for FAX communication and DTMF. / It can be controlled by writing commands from the ASIC (IC1) to the register in the modem (IC5). / This modem (IC5) also sends DTMF signals, and detects busy tones, dial tones and DTMF. Overview of Facsimile Communication Procedures (ITU-T Recommendation):

1. ON ITU-T (International Telecommunications' Union.)

The No. XIV Group of ITU-T, one of the four permanent organizations of the International Telecommunications Union (ITU), investigates and make recommendations on international standards for facsimiles.

2. Definition of Each Group

- Group I (G1)

A-4 size documents without using formats which reduce the band width of a signal sent over telephone lines. / Determined in 1968. / Transmission for about 6 minutes at scanning line density of 3.85 lines/mm.

- Group II (G2)

Using reduction technology in the modulation/demodulation format, an A-4 size document is sent at an official scanning line density of 3.85 lines/mm for about 3 minutes. / Methods to suppress redundancy are not used. / Determined in 1976.

- Group III (G3)

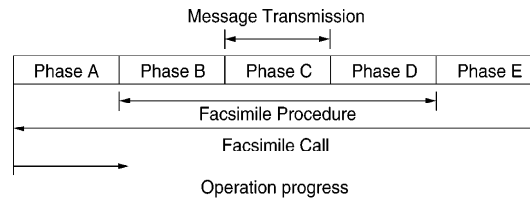
A method of suppressing redundancy in the image signal prior to modulation is used. An A-4 size document is sent with about one minute. / Determined in 1980.

- Group IV (G4)

Transmission is via the data network. A method is provided for suppressing redundancy in signals prior to transmission, and error-free reception of transmission is possible. / The scope of these facsimile applications is not limited simply to transmission of written statements. Through symbiotic linkages with other communication methods, it can be expected to expand to include integrated services.

3. Facsimile Call Time Series

As shown in the following diagram, the facsimile call time series is divided into five phases.



Phase A : Call setting

Call setting can be manual/automatic.

Phase B : Pre-message procedure

Phase B is a pre-processing procedure and sequence for confirming the status of the terminal, transmission route, etc. and for terminal control. It implements the terminal preparation status, determines and displays terminal constants, confirms synchronization status, etc. and prepares for transmission of facsimile messages.

Phase C : Message transmission

Phase C is the procedure for transmitting facsimile messages.

Phase D : Post message procedure

Phase D is the procedure for confirming that the message is completed and received. For continuous transmission, phase B or phase C are repeated for transmission.

Phase E : Call retrieval

Phase E is the procedure for call retrieval, that is for circuit disconnection.

4. Concerning Transmission Time

$$[\text{Transmission Time}] = [\text{Control Time}] + [\text{Image Transmission Time}] + [\text{Hold Time}]$$

Transmission time consists of the following.

Control time:

This is time at the start of transmission when the functions at the sending and receiving sides are confirmed, the transmission mode is established, and transmission and reception are synchronized.

Image transmission time:

This is the time required for the transmission of document contents (image data). In general, this time is recorded in the catalog, etc.

Hold time:

This is the time required after the document contents have been sent to confirm that the document was in fact sent, and to check for telephone reservations and/or the existence of continuous transmission.

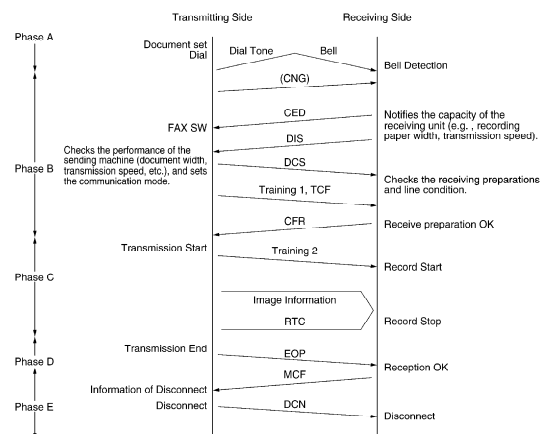
5. Facsimile Standards

Item	Telephone Network Facsimile
	G3 Machine
Connection Control Mode	Telephone Network Signal Mode
Terminal Control Mode	T. 30 Binary
Facsimile Signal Format	Digital
Modulation Mode	PSK (V. 27 ter) or QAM (V. 29)
Transmission Speed	300 bps (Control Signal) 2400, 4800, 7200, 9600 bps (FAX Signal)
Redundancy Compression Process (Coding Mode)	1 dimension: MH Mode 2 dimension: MR Mode (K=2.4)
Resolution	Main Scan: 8 pel/mm Sub Scan: 3.85, 7.7l/mm
Line Synchronization Signal	EOL Signal
1 Line Transmission Time [ms/line]	Depends on the degree of data reduction. Minimum Value: 10, 20 Can be recognized in 40ms.

6. Explanation of Technology

a. G3 Communication Signals (T. 30 Binary Process)

For G3 facsimile communication, this is the procedure for exchanging control signals between the sending and receiving machines both before and after transmission of image signals. / Control signals at 300 bps FSK are: 1850 Hz...0, 1650Hz...1. / An example of the binary process in G3 communication is shown below.



Explanation of Signals

Control signals are comprised mainly of 8-bit identification signals and of the data signals added to them. Data signals are added to DIS and DCS signals.

Signal.....DIS (Digital Identification Signal) / Identification Signal Format.....00000001

Function: / Notifies the capacity of the receiving unit. The added data signals are as follows.

(Example)

Bit No.	DIS/DTC	DCS
1	Transmitter - T.2 operation	
2	Receiver - T.2 operation	Receiver - T.2 operation
3	T.2 IOC = 176	T.2 IOC = 176
4	Transmitter - T.3 operation	
5	Receiver - T.3 operation	Receiver - T.3 operation
6	Reserved for future T.3 operation features.	
7	Reserved for future T.3 operation features.	
8	Reserved for future T.3 operation features.	
9	Transmitter - T.4 operation	
10	Receiver - T.4 operation	Receiver - T.4 operation
11, 12	Data signaling rate	Data signaling rate
(0, 0)	V.27 ter fall back mode	2400 bit/s, V.27 ter
(0, 1)	V.27 ter	4800 bit/s, V.27 ter
(1, 0)	V.29	9600 bit/s, V.29
(1, 1)	V.27 ter and V.29	7200 bit/s, V.29
13	Reserved for the new modulation system.	
14	Reserved for the new modulation system.	
15	Vertical resolution = 7.7 line/mm	Vertical resolution = 7.7 line/mm
16	Two-dimensional coding capability	Two-dimensional coding

Bit No.	DIS/DTC	DCS
17, 18 (0, 0)	Recording width capabilities 1728 picture elements along scan line length of 215 mm \pm 1%	Recording width 1728 picture elements along scan length of 215 mm \pm 1%
(0, 1)	1728 picture elements along scan line length of 215 mm \pm 1% and 2048 picture elements along scan line length of 255 mm \pm 1% and 2432 picture elements along scan line length of 303 mm \pm 1%	2432 picture elements along scan length of 303 mm \pm 1%
(1, 0)	1728 picture elements along scan line length of 215 mm \pm 1% and 2048 picture elements along scan line length of 255 mm \pm 1%	2048 picture elements along scan length of 255 mm \pm 1%
(1, 1)	Invalid	Invalid
19, 20 (0, 0)	Maximum recording length capability A4 (297 mm)	Maximum recording length A4 (297 mm)
(0, 1)	Unlimited	Unlimited
(1, 0)	A4 (297 mm) and B4 (364 mm)	B4 (364 mm)
(1, 1)	Invalid	Invalid

Signal.....DCS (Digital Command Signal) / Identification Signal Format.....X1000001

Function: / Notifies the capacity of the receiving machine obtained at DIS and announces the transmission mode of the sender. The added data signals are as follows.

(Example)

Bit No.	DIS/DTC	Standard setting	DCS
21, 22, 23 (0, 0, 0) (0, 0, 1) (0, 1, 0) (1, 0, 0) (0, 1, 1) (1, 1, 0) (1, 0, 1) (1, 1, 1)	Minimum scan line time capability of the receiver 20 ms at 3.85 l/mm: T7.7 = T3.85 40 ms at 3.85 l/mm: T7.7 = T3.85 10 ms at 3.85 l/mm: T7.7 = T3.85 5 ms at 3.85 l/mm: T7.7 = T3.85 10 ms at 3.85 l/mm: T7.7 = 1/2 T3.85 20 ms at 3.85 l/mm: T7.7 = 1/2 T3.85 40 ms at 3.85 l/mm: T7.7 = 1/2 T3.85 0 ms at 3.85 l/mm: T7.7 = T3.85		Minimum scan line time 20 ms 40 ms 10 ms 5 ms 0 ms
24	Extend field	1	Extend field
25	2400 bit/s handshaking	0	2400 bit/s handshaking
26	Uncompressed mode	0	Uncompressed mode
27	Error correction mode	0	Error correction mode
28	Set to "0".	0	Frame size 0 = 256 octets 1 : octets
29	Error limiting mode	0	Error limiting mode
30	Reserved for G4 capability on PSTN	0	Reserved for G4 capability c
31	Unassigned	0	
32	Extend field	1	Extend field
33 (0) (1)	Validity of bits 17, 18 Bits 17, 18 are valid Bits 17, 18 are invalid	0	Recording width Recording width indicated b 18 Recording width indicated b field bit / information
34	Recording width capability 1216 picture elements along scan line length of 151 ± mm 1%	0	Middle 1216 elements of 172 elements
35	Recording width capability 864 picture elements along scan line length of 107 ± mm 1%	0	Middle 864 elements of 1728 elements
36	Recording width capability 1728 picture elements along scan line length of 151 ± mm 1%	0	Invalid
37	Recording width capability 1728 picture elements along scan line length of 107 ± mm 1%	0	Invalid
38	Reserved for future recording width capabilities.	0	
39	Reserved for future recording width capabilities.	0	
40	Extend field	1	Extend field
41	Semi super time / mm	1	
42	Semi super time / mm	0	
43	Super time	0	

Bit No.	DIS/DTC	Standard setting	DCS
44	Inch	0	
45	mm	1	
46	MSC/SF	0	
47	Select Polling	0	
48	EXT	0	

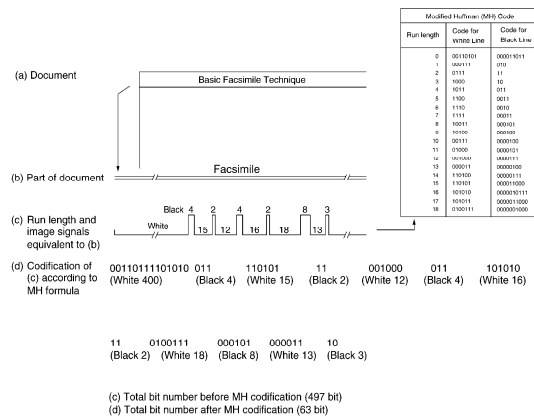
Note 1 - Standard facsimile units conforming to T.2 must have the following capability: Index of cooperation (IOC)=264.

Note 2 - Standard facsimile units conforming to T.3 must have the following capability: Index of cooperation (IOC)=264.

Note 3 - Standard facsimile units conforming to T.4 must have the following capability: Paper length=297 mm.

Signal	Identification Signal Format	Function
Training 1	_____	A fixed pattern is transmitted to the receiving side at a speed (2400 to 9600 bps) designated by the sender and the receiving side optimizes the automatic equalizer, etc., according to this signal.
TCF (Training Check)	_____	Sends 0 continuously for 1.5 seconds at the speed as the training signal.
CFR (Confirmation to Receive)	X0100001	Notifies the sending side that TCF has been properly received. If TCF is not properly received, FTT (Failure To Train) X0100010 is relayed to sender. The sender then reduces the transmission speed by one stage and initiates training once again.
Training 2	_____	Used for reconfirming the receiving side like training 1.
Image Signal	Refer to the next page.	_____
RTC (Return to Control)	_____	Sends 12 bits (0...01 × 6 times) to the receiving side at the same speed as the image signal and notifies completion of transmission of the first sheet.
EOP (End of Procedure)	X1110100	End of one communication
MCF (Message Confirmation)	X0110001	End of 1 page reception
DCN (Disconnect)	X1011111	Phase E starts.
MPS (Multi-Page Signal)	X1110010	Completion of transmission of 1 page. If there are still more documents to be sent, they are output instead of EOP. After MCF reception, the sender transmits an image signal of the second sheet.
PRI-EOP (Procedural Interrupt-EOP)	X1111100	If there is an operator call from the sender, it is output after RTC.
Signal	Identification Signal Format	Function
PIP (Procedural Interrupt Positive)	X0110101	This is output when an operator call is received.

b. Redundancy Compression Process Coding Mode / This unit uses one-dimensional MH format.



5.6.2. MODEM CIRCUIT OPERATION

The modem (IC5) has all the hardware satisfying the ITU-T standards mentioned previously. When the ASIC IC1 (61) is brought to a low level, the modem (IC5) is chip-selected and the resistors inside IC are selected by the select signals from ASIC (IC1) ADR0-ADR4. The commands are written through the data bus, and all the processing is controlled by the ASIC (IC1) according to ITU-T procedures. The INT signal dispatched from IRQ1, 2 (pins 108 and 121 of IC5) to ASIC (IC1) when the transmission data is accepted and the received data is demodulated, the ASIC (IC1) implements post processing. This modem (IC5) has an automatic application equalizer.

With training signal 1 or 2 during G3 reception, it can automatically establish the optimum equalizer. The modem (IC5) operates using the 32.256 MHz clock (X3).

1. Facsimile Transmission

The digital image data on the data bus is modulated in the modem (IC5), and sent from pin 69 via analog SW (IC9) and amplifier IC10 and the NCU section to the telephone line.

Refer to **CHECK SHEET** ()

2. Facsimile Reception

The analog image data which is received from the telephone line passes through the NCU section and enters pin 60 of the modem (IC5). The signals that enter pin 60 of the modem (IC5) are demodulated in the board to digital image signals, then placed on the data bus.

In this case, the image signals from the telephone line are transmitted serially. Hence, they are placed on the bus in 8 bit units. Here, the internal equalizer circuit reduces the image signals to a long-distance receiving level.

This is designed to correct the characteristics of the frequency band centered about 3 kHz and maintain a constant receiving sensitivity. It can be set in the service mode.

Refer to **CHECK SHEET** ()

3. DTMF Transmission (Monitor tone)

The DTMF signal generated in the modem (IC5) is output from pin 69, and is then sent to the circuit on the same route as used for facsimile transmission.

Refer to **CHECK SHEET** ()

(DTMF Monitor Tone)

Refer to **CHECK SHEET** ()

4. Busy/Dial Tone Detection

The path is the same as FAX receiving. When it is detected, the carrier detect bit of the resistor in the modem (IC5) becomes 1, and this status is monitored by the ASIC (IC1).

5.7. ANALOG UNIT BLOCK DIAGRAM

5.8. NCU SECTION

5.8.1. GENERAL

This section is the interface between the telephone line. It is composed of bell detection circuit, pulse dialing circuit, CPC detection circuit, line amplifier, sidetone circuits and Remote FAX activation circuit.

5.8.2. LINE RELAY (RLY1)

1. Circuit Operation

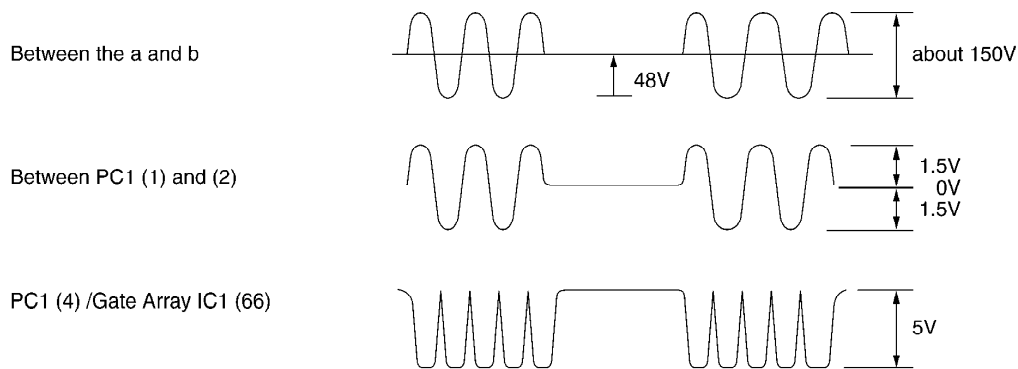
Normally, this relay switches to the external telephone side (Break) and switches to the open side (make) when the unit starts facsimile communication.

[IC1 (130) High Level → CN2 (9)] → CN1 (9) → Q3 ON → RLY1 (make)

5.8.3. BELL DETECTION CIRCUIT

1. Circuit Operation

The signal waveform for each section is indicated below. The signal (low level section) input to pin 66 of ASIC IC1 on the digital board is read.



TEL LINE → PC1 (1, 2 - 4) → CN1(6) → [CN2(6) → IC1(66)]

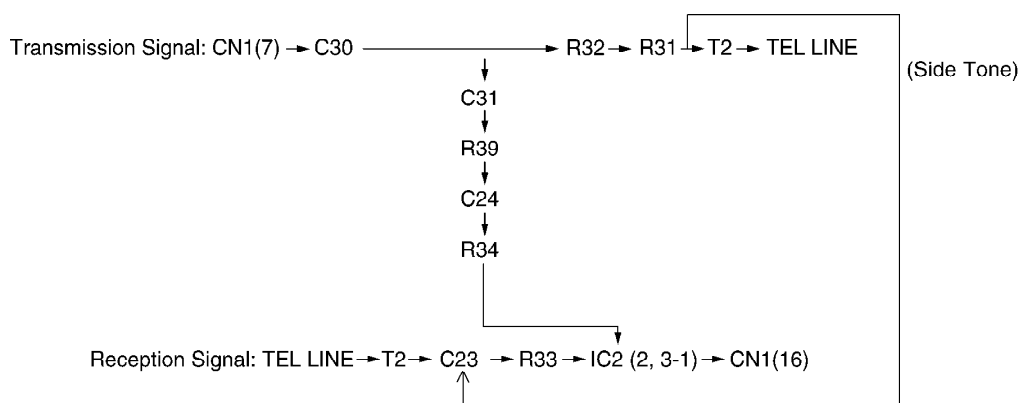
5.8.4. PULSE DIALIG

[IC1 (130) High Level → CN2 (9)] → CN1 (9) → Q3 ON → RLY1 (make)

5.8.5. LINE AMPLIFIER AND SIDE TONE CIRCUITS

1. Circuit Operation

The reception signal received as output from line transformer T2 is given as input to C23, R33 and IC2(2). / Then it is input to the reception system at an amplifier gain of 3.3 dB from pin (2). / The transmission signal is input from CN1 pin (7), and output to the TEL line through C30, R32, R31 and T2. Without a side tone circuit, the transmission signal would return to the reception amplifier via C30 and R31. Here, the signal output from CN1 pin (7) passes through C30, C31 and R39, and enters the amplifier IC2 pin (3). This is used to cancel the return portion of the transmission signal. This is the side tone circuit.



5.8.6. CPC (CALLING PARTY CONTROL) DETECTION CIRCUIT

1. Function

This circuit detects the signal (cuts the current) output from the converter when the other party finishes ICM recording and goes into the ON-HOOK status.

TAD detects this signal and disconnects the line. When the TAD is operating, pin (4) of PC2

becomes a low level.

While detecting the CPC signal, pin (4) of PC2 becomes a high level. When the CPC signal is detected, the TAD operation stops and the line is disconnected.

5.9. ITS (INTEGRATED TELEPHONE SYSTEM) AND MONITOR SECTION

5.9.1. GENERAL

The general ITS operation is performed by the modem IC5. The alarm tone, the key tone, the calling tone and the beep are output from the ASIC IC1 (digital board).

5.9.2. SPEAKER PHONE CIRCUIT

1. Function

The circuit controls the automatic switching of the transmitted and received signals, to and from the telephone line, when the unit is used in the hands-free mode.

2. Circuit Operation

The speakerphone can only provide duplex.

3. Signal path

Refer to **CHECK SHEET** ()

5.9.3. HANDSET CIRCUIT

1. Function

This circuit controls the conversation over the handset, i.e. the transmitted and received voices to and from the handset.

2. Signal path

Refer to **CHECK SHEET** ()

5.9.4. MONITOR CIRCUIT FOR EACH SIGNALS

1. Function

This circuit monitors various tones, such as 1 DTMF tone, 2 Alarm /Beep/Key tone/Bell 3 Dummy ring back tone.

2. Signal path

Refer to **CHECK SHEET** () / /

5.10. ATAS (AUTOMATIC TELEPHONE ANSWERING SYSTEM) SECTION

1. Function

The ATAS main operation is performed by the special IC5

(MODEM). IC6 (FLASH MEMORY)'s control signals are input from ASIC IC1.

- A. Greeting/Message Recording
- B. ICM Recording
- C. Greeting/Message/ICM play to speaker
- D. Greeting/Message/ICM play to Tel Line
- E. Vox Detection

2. Signal Path

Refer to **CHECK SHEET** () / /

5.10.1. REMOTE RECEIVING

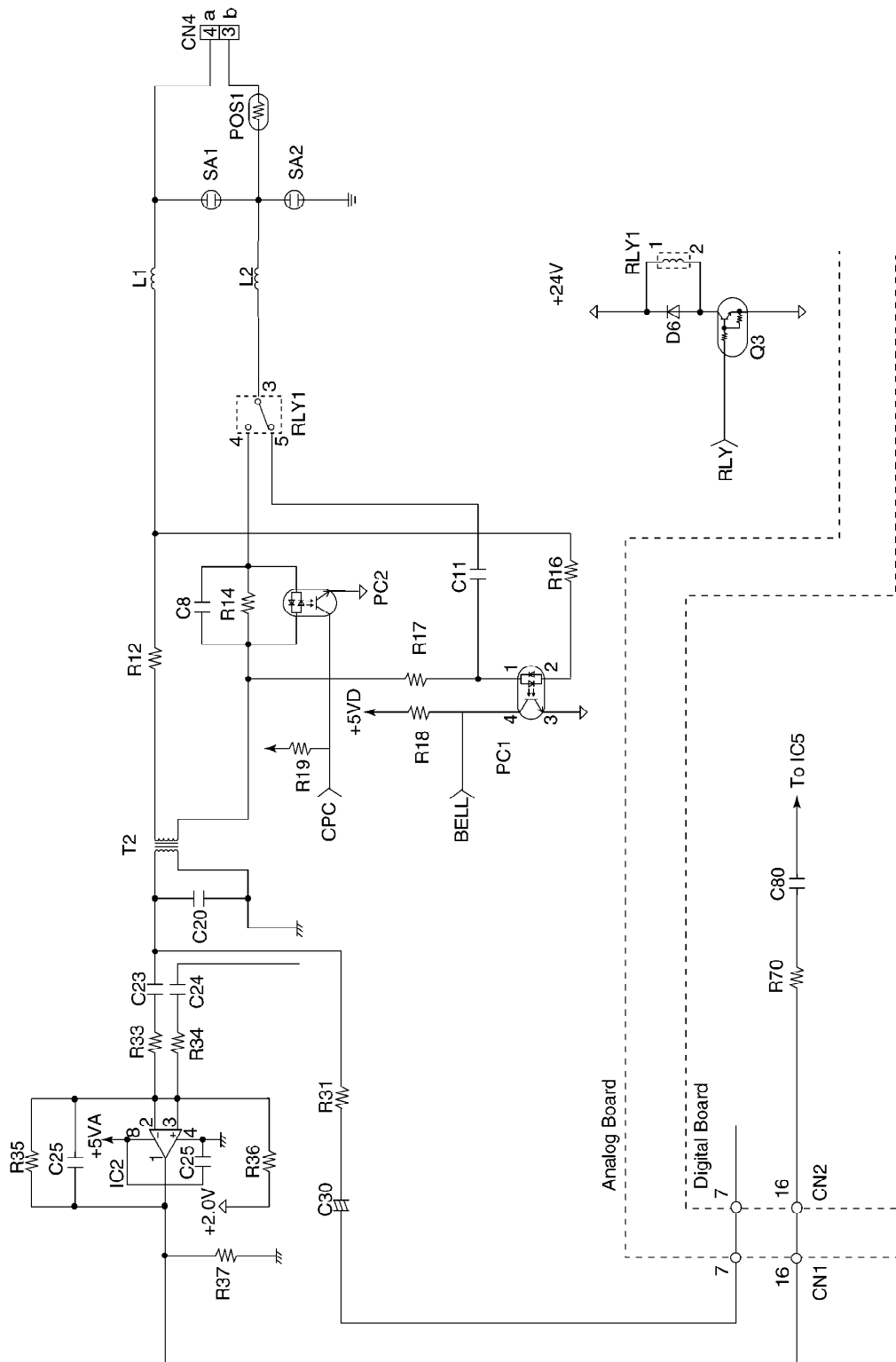
1. Function

This is the parallel connection DTMF signal for the TEL mode between a and b. When the other party is a FAX, the unit changes to FAX receiving.

2. Signal Path

Refer to **CHECK SHEET** ()

5.10.2. CIRCUIT DIAGRAM



5.11. OPERATION BOARD SECTION

The unit consists of an LCD (Liquid crystal display), KEYs and LED (light-emitting diode). They are controlled by the Gate Array (IC1) and ASIC (IC1: on the DIGITAL BOARD). The key matrix table is shown below.

Key Matrix

O \ I	KIN 0	KIN 2	KIN 3	KIN 4	KIN 5	KIN 6	KIN 7
KSL0	RECEIVE MODE (SW29)	RECORE (SW21)	RESERVE (SW17)	8 (SW8)	9 (SW9)	7 (SW7)	VOL + (SW25)
KSL1	STOP (SW28)	PLAY (SW20)	ERASE (SW16)	5 (SW5)	6 (SW6)	4 (SW4)	BROADCAST (SW24)
KSL2	COPY (SW31)	MENU (SW23)	SP-PHONE (SW19)	REDIAL (SW14)	MUTE (SW15)	FLASH (SW13)	NEXT (SW27)
KSL3				2 (SW2)	3 (SW3)	1 (SW1)	
KSL4	FAX/START / SET (SW30)	PREV (SW22)	VOL - (SW18)	0 (SW11)	# (SW12)	* (SW10)	HELP (SW26)

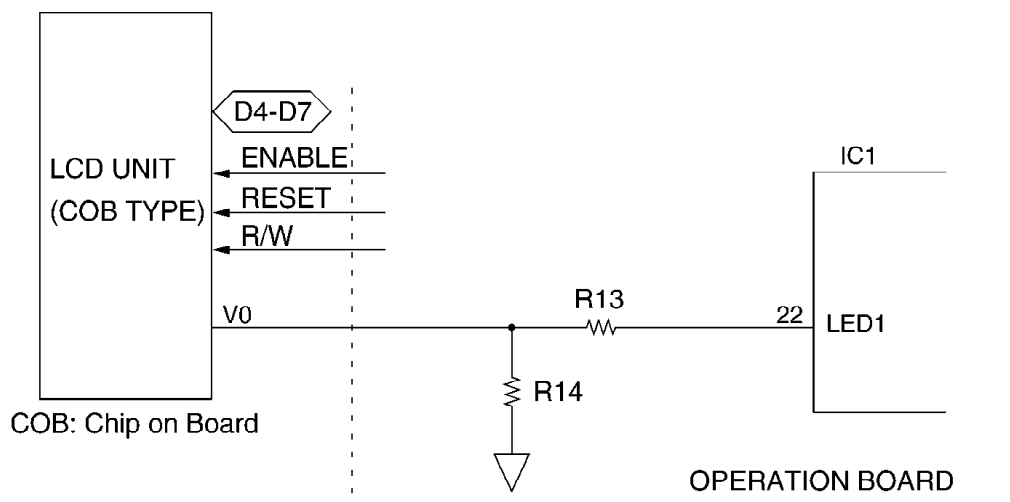
LED

	XLED14
	LED1 PLAY MESSAGES

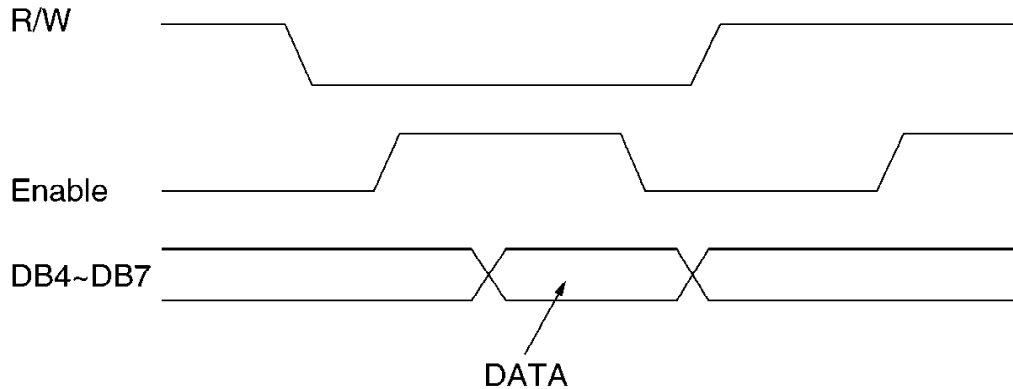
5.12. LCD SECTION

The Gate Array (IC1) works only for writing the ASCII code from data bus (D4-D7). V0 is supplied for the crystal drive. R13 and R14 are density control resistors. Consequently, in this unit, the timing (positive clock) is generated by the LCD interface circuitry in the gate array (IC1).

Circuit Diagram



Timing Chart

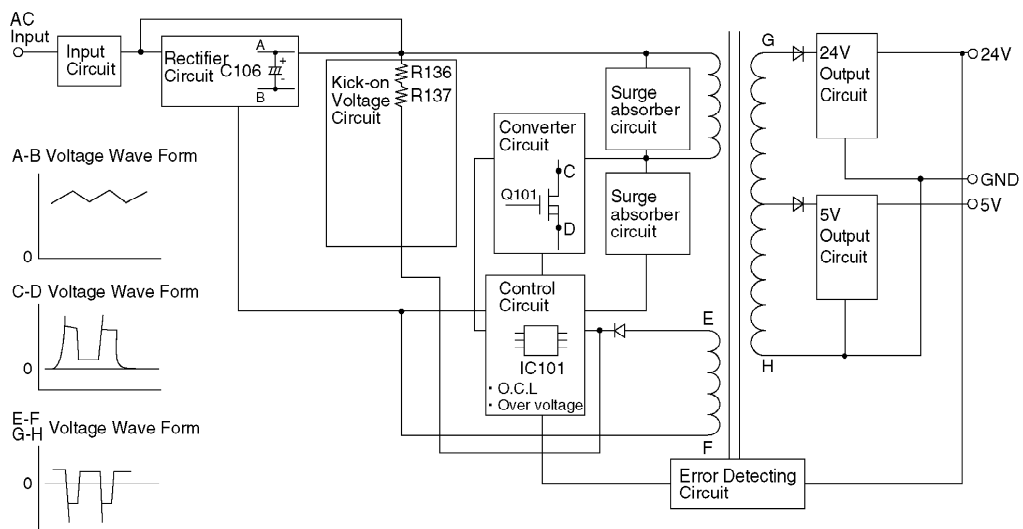


Density	Normal	Dark
LED1 (IC1-22pin)	H	L

5.13. POWER SUPPLY BOARD SECTION

This power supply board uses the switching regulator method.

Block Diagram



[Input Circuit]

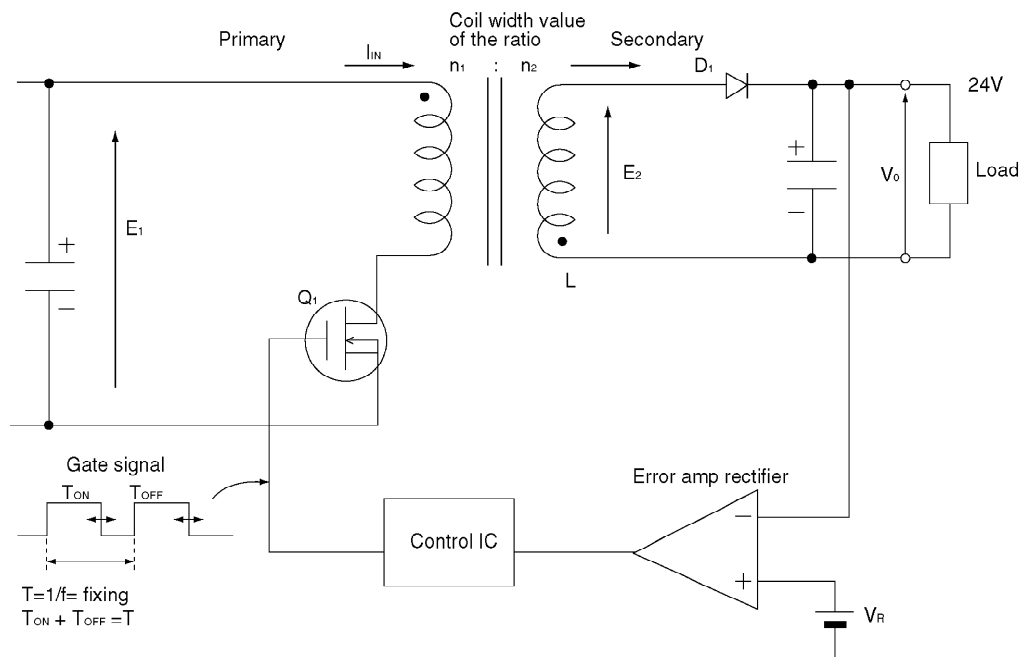
The input current goes into the input rectifier circuit through the filter circuit. The filter circuit decreases the noise voltage and the noise electric field strength.

[Rectifier Circuit]

The input current is rectified by D101, D102, D103 and D104 and charges C106 to make DC voltage. Then it supplies power to the converter circuit.

[Kick-on voltage circuit]

Bias is applied to the Q101 gate via this circuit when the AC power is turned on and Q101 begins operating.



The following is an overview of how the power supply unit is controlled.

The control method of this power supply unit is pulse width modulation.

When Q_1 is ON, the energy is charged in the transfer primary coil according to E_1 . When Q_1 is OFF, the energy is output from the secondary transfer as follows.

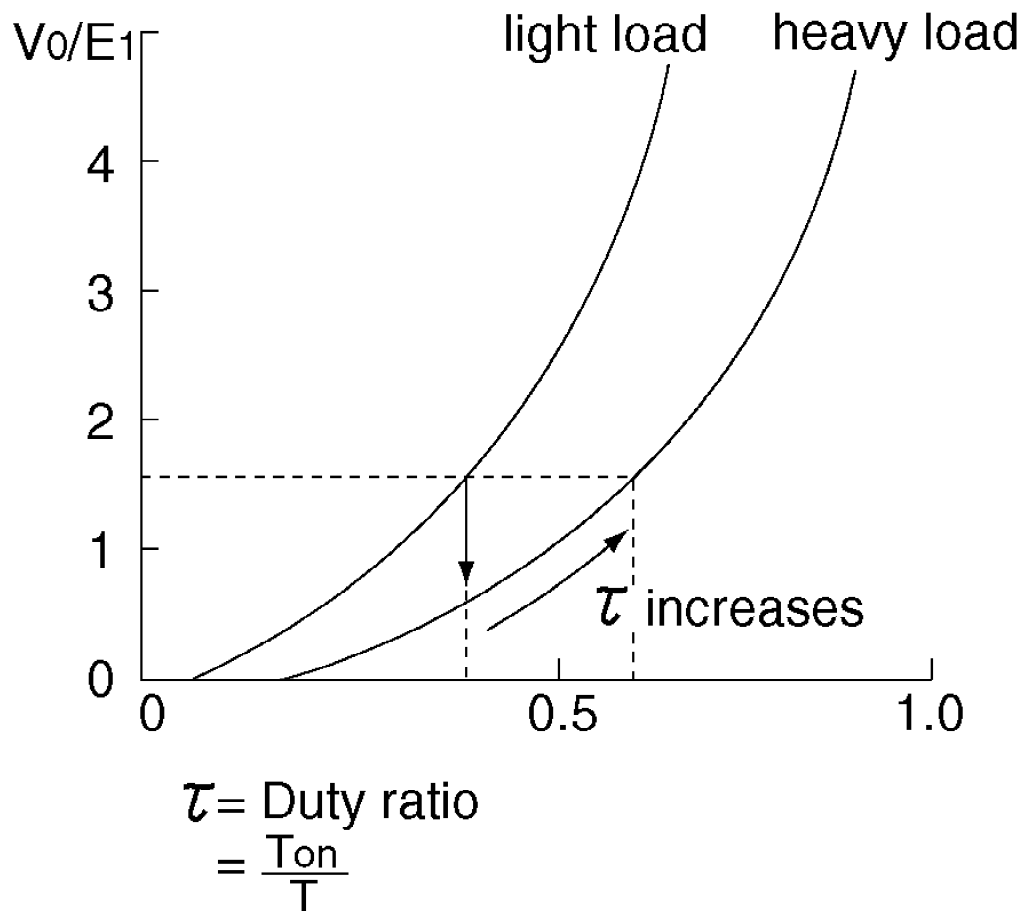
$L \rightarrow D_1 \rightarrow \text{Load} \rightarrow L$

Then the power is supplied to the Load. When Q_1 is ON, power is not output from the secondary side. The output voltage is fed back in the control IC according to the error amp rectifier. Then depending on how T_{ON} is controlled, stabilization occurs. Also, when the current load becomes

too large, in order to decrease the voltage output, the increase in τ is controlled and the output voltage is stabilized.

Therefore, basically the timing: T_{on}/T_{off} of Q_1 controls the output voltage.

Output/Input voltage value of ratio



[Surge Absorber Circuit]

This circuit is for absorbing surge voltage generated by the transformer.

[Control Circuit and Detecting Circuit]

The control circuit amplifies the output with increased voltage detected in the error detecting circuit. Then it drives the main transistor.

In this power supply, the duty ratio is defined by changing the ON period of the main transistor.

This is shown as follows.

When the output voltage of the 24V circuit increases, the current of the photo coupler PC101 increases, the pulse width of the output control IC becomes narrower and the ON period of Q101 becomes shorter.

[Over Current Limiter (O.C.L.)]

The highest drain current (Q101) is limited by a limiter circuit (IC101) of 24V. The 24V output is limited by this circuit.

[Over Voltage Circuit]

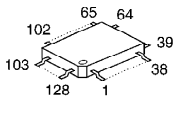
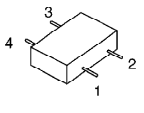
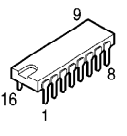
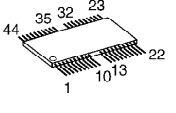
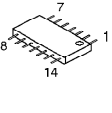
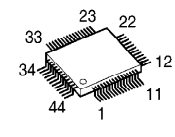
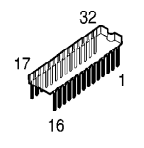
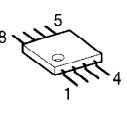
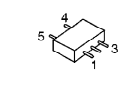
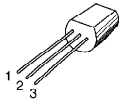

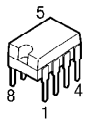
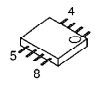
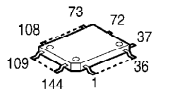
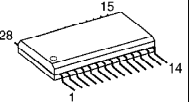

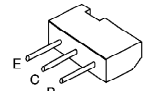
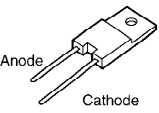
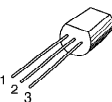

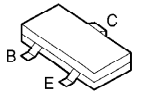
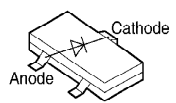
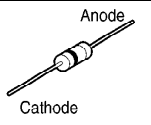
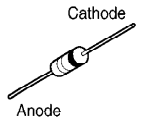
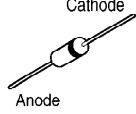
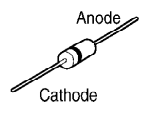
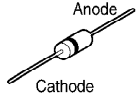
If the 24V output increases because the error detecting circuit or control circuit is broken, IC101 will recognize this signal and output becomes 0V.

Dummy load method (to quickly check the power supply output)

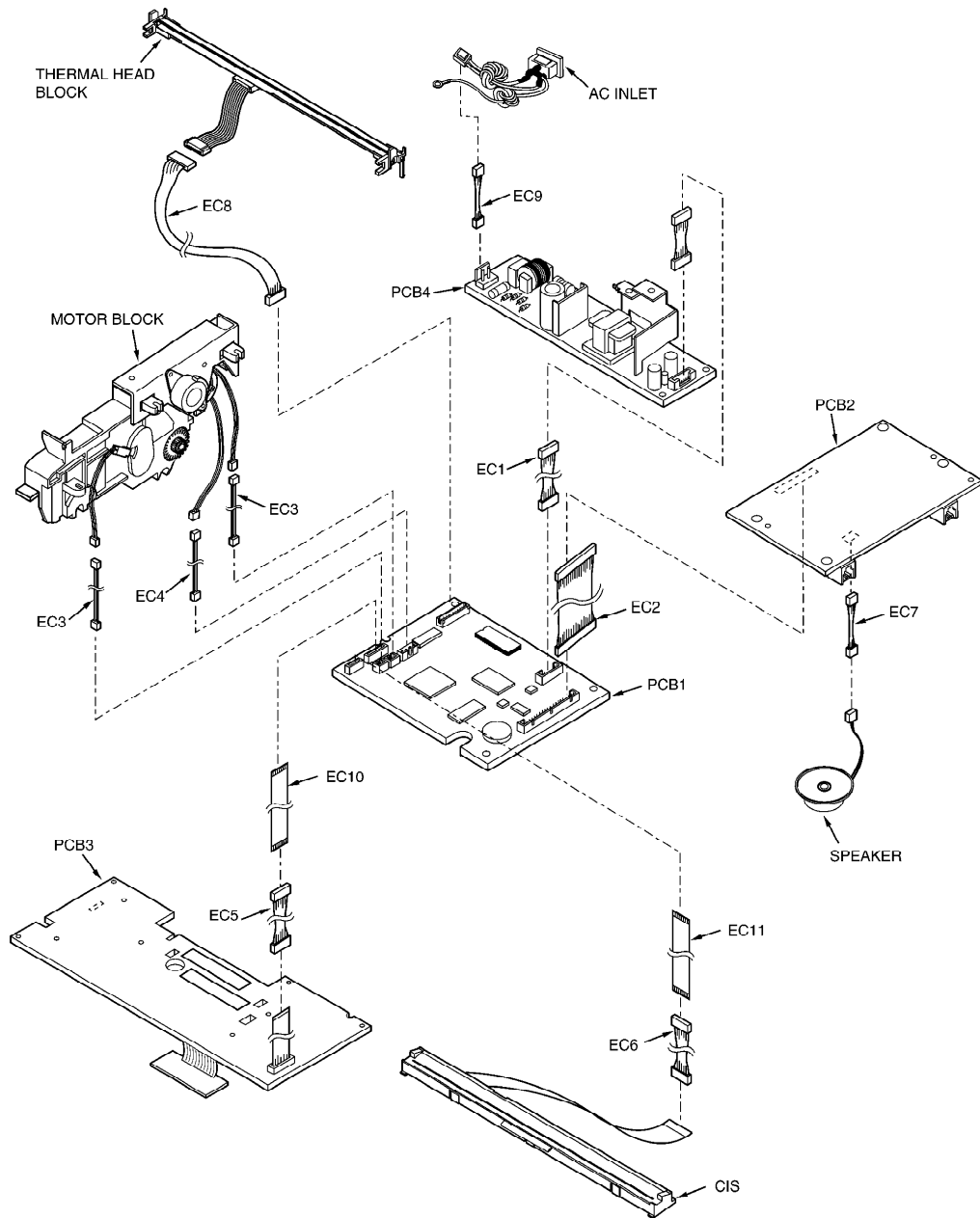
Refer to **POWER SUPPLY BOARD SECTION** ().

6. TERMINAL GUIDE OF THE IC'S TRANSISTORS

AND DIODES

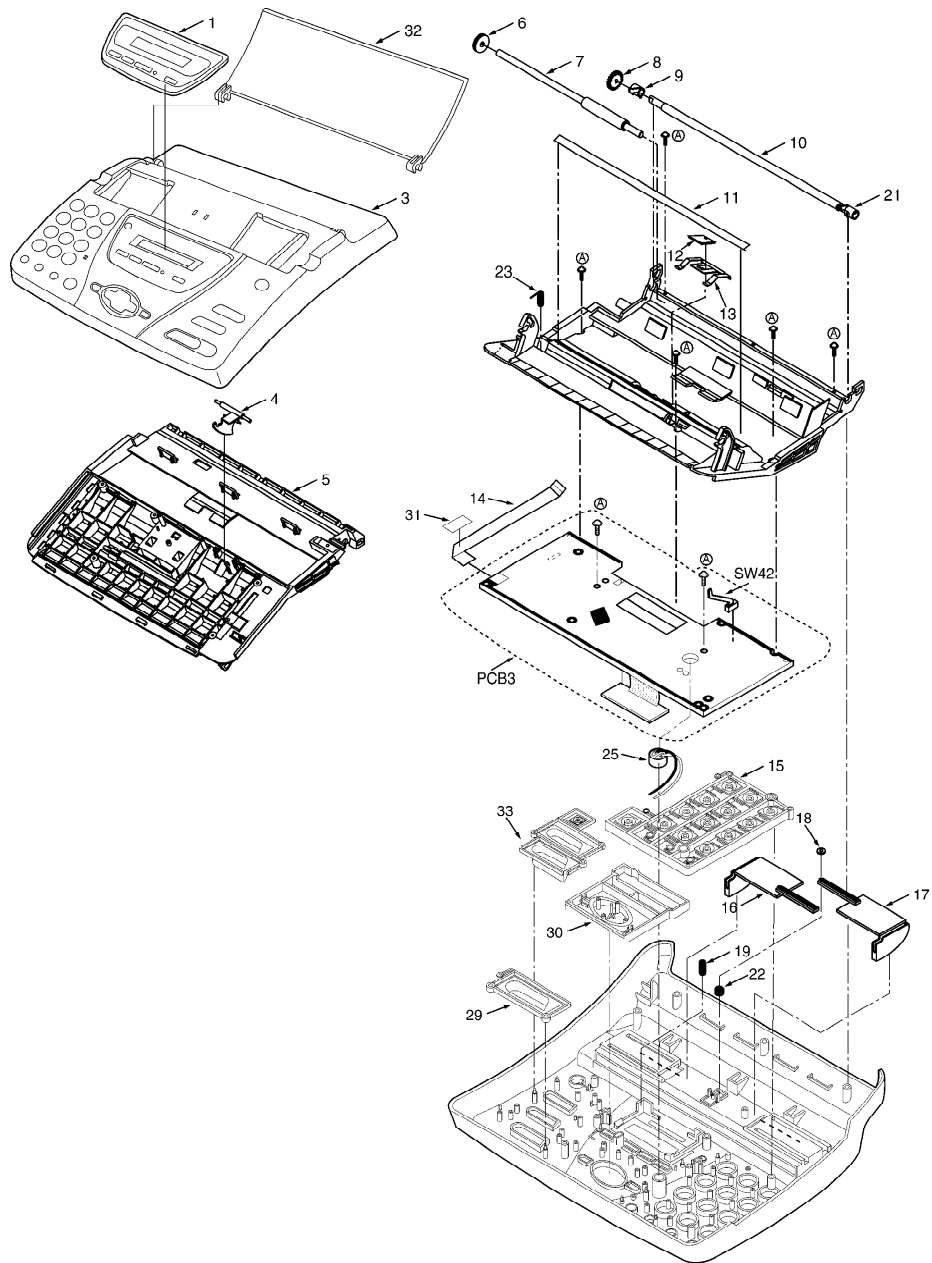
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 MN7D032Z9J	 PFWIFT78BR	 PQVIMC34119M PQVINJM4558M	 PFVIMM1385EN	 AN1431T
 2SD1819A	 PFVIFA5317P	 PFVINJM2904M PFVTSI4431DY	 PFVIM66440M1	 PFVIBSL256SC
 LNJ801LPDJA	 2SB1322	 PFVDSF5LC20U	 PFVITA7805F 2SK2640	 PQVDRLS73T
 PQVTDTC143E PQVTDTC144EU 2SB1218A, 2SC4155R	 MA141WK	 PFVD1N4005, MA4220 PFVDD1NL20U, PQVD1N7200R	 PFVDRMRLS245	 1SS131
 PQVDERA1802 PFVDAG01A PQVDMZJ5R6A	 MA165			

7. FIXTURES AND TOOLS

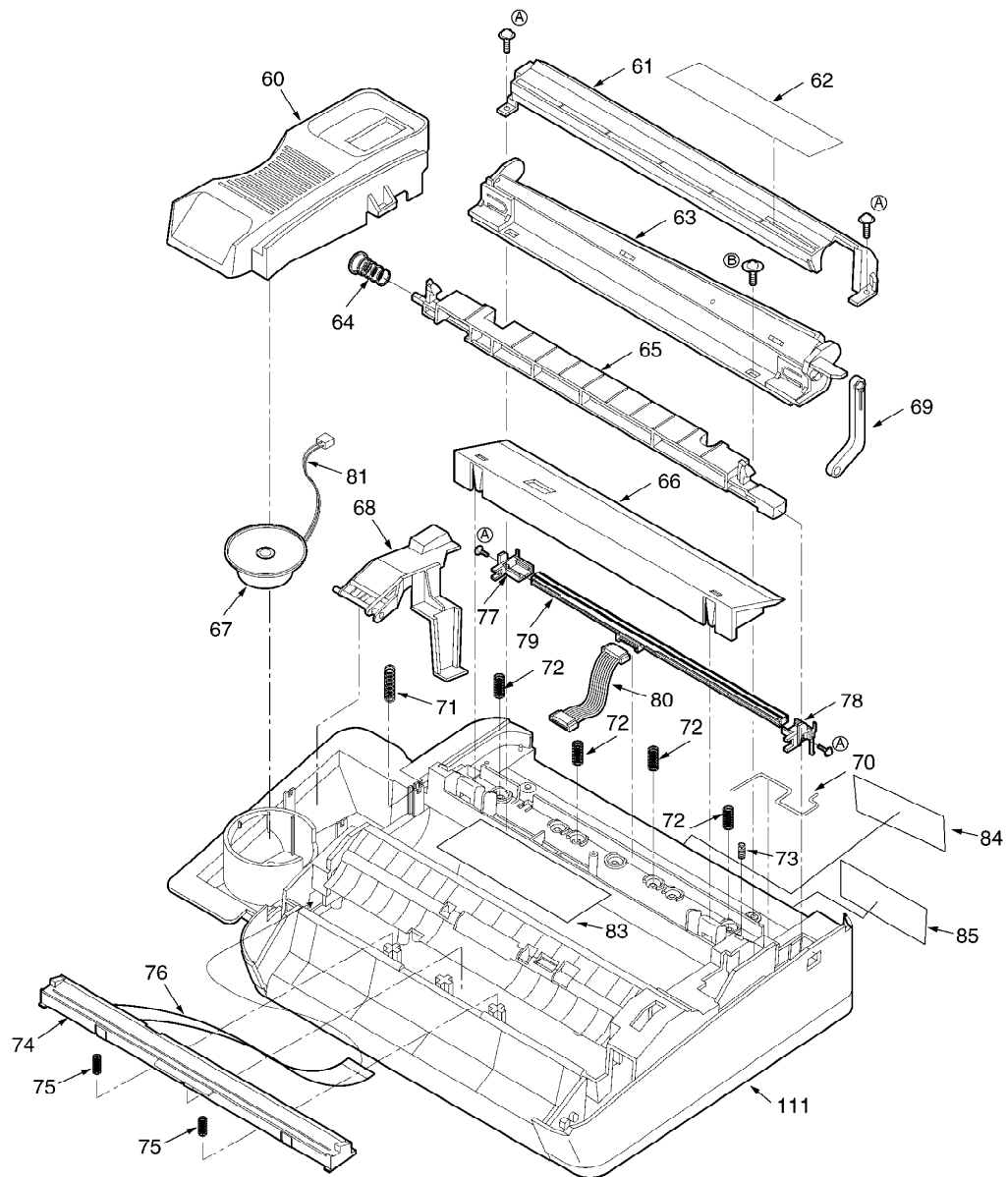


8. CABINET, MECHANICAL AND ELECTRICAL PARTS LOCATION

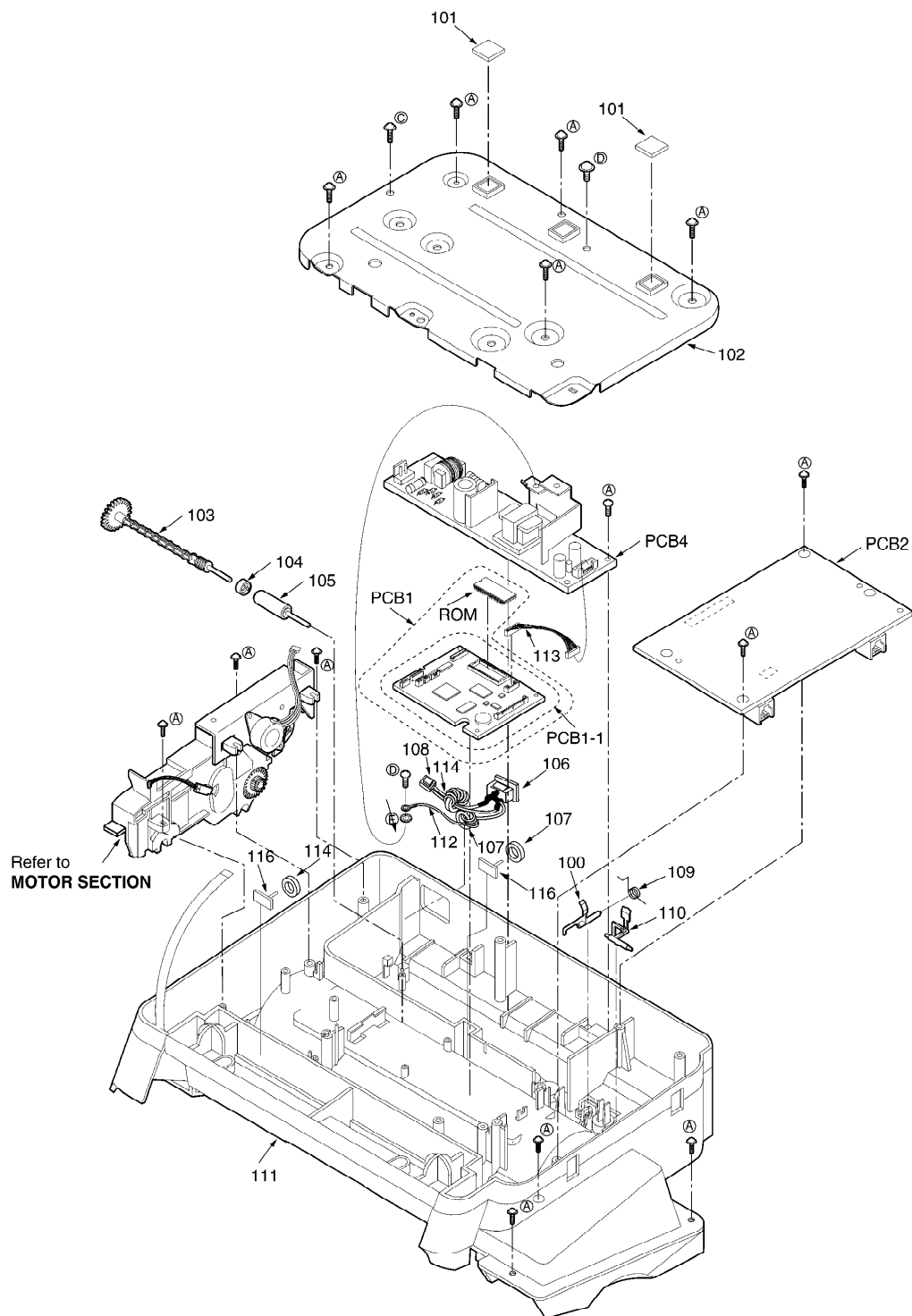
8.1. OPERATION PANEL SECTION



8.2. UPPER CABINET SECTION

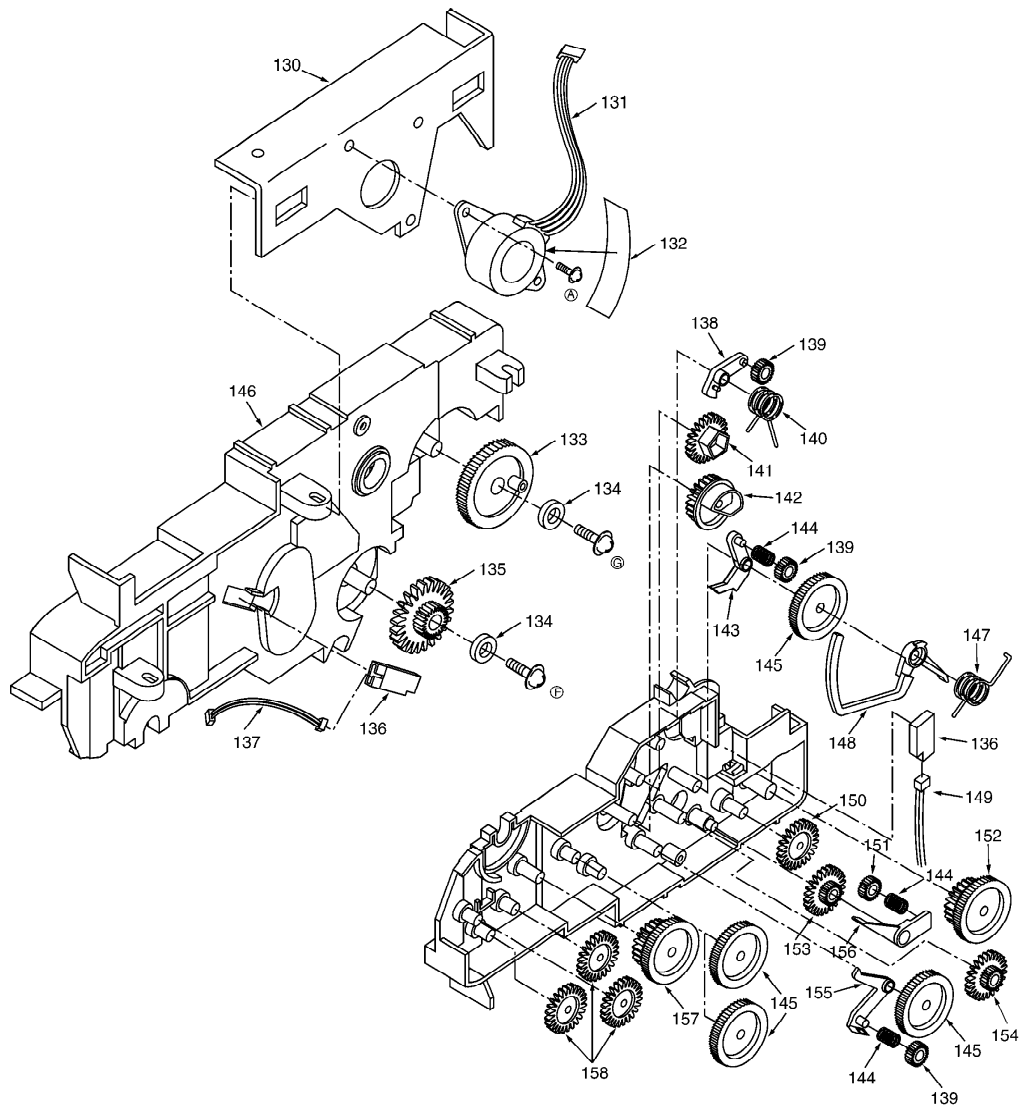


8.3. LOWER CABINET/P.C.B. SECTION

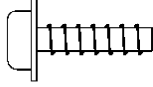
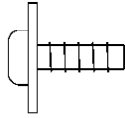
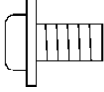






CROSS REFERENCE:
MOTOR SECTION 0()

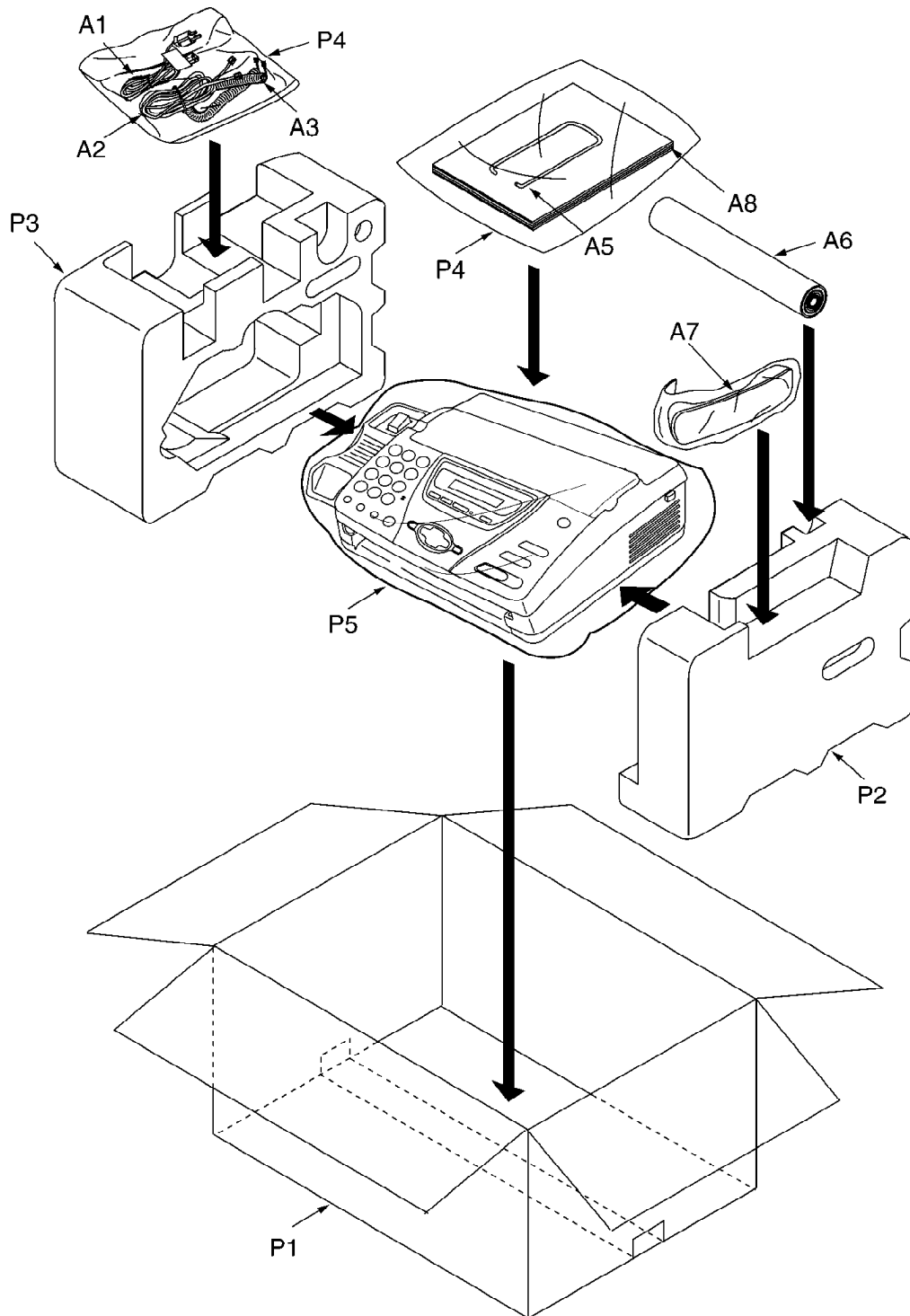
8.4. MOTOR SECTION



8.5. ACTUAL SIZE OF SCREWS AND WASHER

	Part No.	Illustration
Ⓐ	XTW3 + S10P	
Ⓑ	XTW3+W8P	
Ⓒ	XTW3+U6LFZ	
Ⓓ	XSB4+6	
Ⓔ	XWC4B	
Ⓕ	XTN2+12GFX	
Ⓖ	XTN2+14GFX	

9. ACCESSORIES AND PACKING MATERIALS




10. REPLACEMENT PARTS LIST

Notes:

1. The marking (RTL) indicates that the Retention Time is limited for this item.
After the discontinuation of this assembly in production, the item

will continue to be available for a specific period of time. The retention period of availability is dependent on the type of assembly, and in accordance with the laws governing parts and product retention.

After the end of this period, the assembly will no longer be available.

2. Important safety notice / Components identified by  mark have special characteristics important for safety. When replacing any of these components, use only manufacture's specified parts.
3. The S mark indicates service standard parts and may differ from production parts.
4. ISO code (Example : ABS-HB) of the remarks column shows quality of the material and a flame resisting grade about plastics.
5. RESISTORS & CAPACITORS / Unless otherwise specified; / All resistors are in ohms (Ω) K=1000 Ω , M=1000k Ω / All capacitors are in MICRO FARADS (μ F) P= μ μ F / *Type & Wattage of Resistor

Type					
ERC:Solid		ERX:Metal Film		PQRD:Carbon	
ERD:Carbon		ERG:Metal Oxide		PQRQ:Fuse	
PQ4R:Chip		ERO:Metal Film		ERF:Wire Wound	
Wattege					
10,16,18:1/8W		14,25,S2:1/4W		12,50,S1:1/2W	
				1:1W	
				2:2W	
				5:5W	
ECFD:Semi-Conductor		ECCD,ECKD,PQCBC,PQVP : Ceramic			
ECQS:Styrol		ECQM,ECQV,ECQE,ECQU,ECQB : Polyester			
PQCBX,ECUV:Chip		ECEA,ECSZ,ECOS : Electrolytic			
ECMS:Mica		ECQP : Polypropylene			
Voltage					
ECQ Type	ECQG ECQV Type	ECSZ Type	Others		
1H : 50V	05 : 50V	OF : 3.15V	OJ : 6.3V	1V : 35V	
2A : 100V	1 : 100V	1A : 10V	1A : 10V	50,1H : 50V	
2E : 250V	2 : 200V	1V : 35V	1C : 16V	1J : 63V	
2H : 500V		OJ : 6.3V	1E,25 : 25V	2A : 100V	

10.1. CABINET AND ELECTRICAL PARTS


10.1.1. OPERATION PANEL SECTION

Ref. No.	Part No.	Part Name & Description	Remarks
<u>1</u>	PFGP1222W	PANEL, LCD	PC-HB
<u>2</u>	Not Used		S
<u>3</u>	PFGG1178W3	GRILLE OPERATION PANEL	S PS-HB
<u>4</u>	PFDE1096Z	LEVER, DOCUMENT DETECTION	POM-HB
<u>5</u>	PFUV1056Z	COVER, OPERATION	PS-HB
<u>6</u>	PFDG1170Z	GEAR, PLATEN	POM-HB
<u>7</u>	PFDN1044Z	ROLLER, PLATEN	
<u>8</u>	PFDG1123Z	GEAR, PLATEN	
<u>9</u>	PFDJ1021Z	PLATEN SPACER, R	POM-HB
<u>10</u>	PFDN1033Z	ROLLER, PLATEN	
<u>11</u>	PFHX1360Z	COVER READING SHEET	
<u>12</u>	PFHG1064Z	SEPARATION RUBBER	
<u>13</u>	PFUS1173Z	SPRING, DOCUMENT FEED	
<u>14</u>	PFJE1032Z	LEAD WIRE	
<u>15</u>	PFBX1171Z1	KEY, DIAL	S ABS-HB
<u>16</u>	PFKR1026Z3	DOCUMENT GUIDE,R	S ABS-HB
<u>17</u>	PFKR1025Z3	DOCUMENT GUIDE,L	S ABS-HB
<u>18</u>	PFDG1015Y	GEAR,DOCUMENT GUIDE	POM-HB
<u>19</u>	PFUS1170Z	SPRING,DOCUMENT LEVER	
<u>20</u>	Not Used		
<u>21</u>	PFDJ1020Z	PLATEN SPACER, L	POM-HB
<u>22</u>	PFUS1222Z	SLIDER SPRING	
<u>23</u>	PFUS1286Z	SPRING, OPERATION EARTH	
<u>24</u>	Not Used		
<u>25</u>	PQJM128Z	BULTIN-MICROPHONE	
<u>26</u>	Not Used		
<u>27</u>	Not Used		
<u>28</u>	Not Used		S
<u>29</u>	PFBC1094Z1	KEY,START	S ABS-HB
<u>30</u>	PFBX1182Z1	KEY,FANCTION NABI	ABS-HB
<u>31</u>	PFHX1578Z	SHEET, OPEPANE	
<u>32</u>	PFKS1077Z3	DOCUMENT,TRY	
<u>33</u>	PFBX1173Z3	KEY,COPY STOP	ABS-HB

10.2. UPPER CABINET/THERMAL HEAD SECTION

Ref. No.	Part No.	Part Name & Description	Remarks
60	PFKM1049Z4	HANDSET CRADLE	S PS-HB
61	PFKV1026Z2	COVER,CUTTER	S PS-HB
62	PFQT1698Y	CUTTER CAUTION LABEL	
63	PFDX1025Z	CUTTER UNIT	
64	PFUS1179Z	LOOK LEVER SPRING	
65	PFDE1137Y1	LEVER,LOCK	S ABS+GF20%
66	PFHR1219Z	COVER,HEAD	
67	PFAS50P003Z	SPEAKER	
68	PFBH1011Z1	BUTTON,HOOK	S ABS-HB
69	PFHR1214Z	ARM,CUTTER	POM-HB
70	PFUS1256Z	SPRING,EARTH CUTTER	
71	PFUS1176Z	SPRING,OPERATION COVER OPEN	
72	PFUS1318Z	THERMAL HEAD SPRING	
73	PFUS1257Z	SPRING,EARTH HEAD	
74	N2GBBE000002	IMAGE SENSOR	
75	PFUS1285Z	SPRING,CIS	
76	PFJE1005Z	LEAD WIRE	
77	PFDE1135Z	HEAD GUIDE,L	POM-HB
78	PFDE1136Z	HEAD GUIDE,R	POM-HB
79	PFJHS023Z	THERMAL HEAD	
80	PFJS12Q80Z	LEAD,THERMAL	
81	PFJS02Q42Z	CONNECTOR, 2PIN	
82	Not Used		
83	PFQT1952Z	PAPER CAUTION LABEL	
84	PFGT2059Z-M	NAME PLATE	
85	PFQX1186X	CAUTION LABEL	


10.2.1. LOWER SECTION

Ref. No.	Part No.	Part Name & Description	Remarks
100	PFDE1097Z	PAPER SENSOR LEVER	
101	PFHA1001Z	LEG RUBBER	
102	PFMD1046Z	FRAME BOTTOM	
103	PFDF1051Z	SHAFT	POM-HB
104	PFDE1133Z	SPACER	POM-HB
105	PFDR1015Z	ROLLER SUPPORT	
106	PFJP03S04Z	AC INLET	
107	PQLB1E1	FERRITE CORE	
108	PFJS02Q82Z	CONNECTOR,2PIN	
109	PFUS1319Y	SPRING,SENSOR	
110	PFDE1134Z	LEVER,JAM SENSOR	PBT-VO
111	PFKM1064Y2	CABINET,MAIN	S PS-VO
112	WLR18YK26CM4	EARTH LEAD	S
113	PFJS07Q81Z	LEAD,POWER	
114	KR06TT251508	FERRITE CORE	
115	Not Used		
116	PQHR136Z	CLAMPER	

10.2.2. GEAR CHASSIS SECTION

Ref. No.	Part No.	Part Name & Description	Remarks
130	PFMH1084Z	MOTOR PLATE	
131	DCNR351S15R	MOTOR	S
132	PFHX1399Z	MOTER SHEET	
133	PFDG1174Y	GEAR,CUTTER	POM-HB
134	PFHX1413Z	GEAR SHEET	
135	35S1S15DCNR	GEAR	POM-HB
136	PQST2A04Z	SENSOR	
137	PFJS03Q43Z	SENSOR LEAD	
138	PFHR1218Z	ARM	POM-HB
139	PFDG1021Z	GEAR,C	POM-HB
140	PFUS1251Z	SPRING,BACK	
141	PFDG1167Z	GEAR,MODE	POM-HB
142	PFDG1168Z	GEAR,MODE	POM-HB
143	PFHR1216Z	ARM	POM-HB
144	PFUS1253Y	SPRING,GEAR	
145	PFDG1022Z	GEAR,D	POM-HB
146	PFUA1026X	BASE,GEAR	PBT-ABS
147	PFUS1252Z	SPRING,CUTTER	
148	PFHR1215Z	ARM,CUTTER	POM-HB
149	PFJS03Q79Z	LEAD	
150	PFDG1129Z	GEAR S	POM-HB
151	PFDG1134Z	GEAR,C	POM-HB
152	PFDG1173Z	GEAR,CUTTER	POM-HB
153	PFDG1132Y	GEAR,A	POM-HB
154	PFDG1172Z	GEAR,BASE	POM-HB
155	PFHR1217Z	ARM	POM-HB
156	PFHR1213Z	ARM,CUTTER	POM-HB
157	PFDG1171Z	GEAR,SENDING	POM-HB
158	PFDG1169Z	GEAR	POM-HB

10.2.3. ACCESSORIES AND PACKING MATERIALS

Ref. No.	Part No.	Part Name & Description	Remarks
A1	PFJA03A007Z	POWER CORD	
A2	PQJA10075Z	TEL CORD	
A3	PFJA04C002Y	CURL CORD	
A4	Not Used		
A5	PQUS10136Z	PAPER STACKER	
A6	PQHP10023Z	ROLL PAPER	
A7	PFJXE0808Z	HANDSET	
A8	PFQX1722Z	INSTRUCTION BOOK	
P1	PFPE1338Z-M	GIFT BOX ASS'Y	S
P2	PFPN1289Z	CUSHION	
P3	PFPN1288Z	CUSHION	
P4	PQPP10005Z	BAG,POLYETHYLENE	
P5	PFPH1030Z	SOFT SHEET	

10.3. DIGITAL BOARD PARTS

Ref. No.	Part No.	Part Name & Description	Remarks
PCB1	PFWP1FT78BR	DIGITAL BOARD ASS'Y (RTL)	
PCB-1	PFLP1436BRZ	DIGITAL BOARD ASS'Y (RTL)(without ROM)	
		(ICS)	
IC1	PFVIM66440M1	IC	S
IC2	PFWIFT78BR	IC (ROM)	
IC3	PFVIS80842AN	IC	S
IC4	PFVIBSL256SC	IC	
IC5	PFVIR675813	IC	
IC6	PQVIKM29N4TC	IC	S
IC7	PQVIMM1385EN	IC	S
IC8	PFVIT2003APS	IC	S
IC9	PQVITC4066BF	IC	S
IC10	PQVINJM4558M	IC	S
IC11	PFVINJM2904M	IC	S
IC12	PFVINJM2904M	IC	S
		(TRANSISTORS)	
Q3	2SD1819A	TRANSISTOR(SI)	S
Q4	2SD1819A	TRANSISTOR(SI)	S
Q5	2SD1819A	TRANSISTOR(SI)	S
Q6	2SD1819A	TRANSISTOR(SI)	S
Q7	2SB1218A	TRANSISTOR(SI)	
Q8	PQVTD143Z106	TRANSISTOR(SI)	S
Q9	PQVTDTC114EU	TRANSISTOR(SI)	S
Q10	2SB1322	TRANSISTOR(SI)	S
Q11	PQVTDTC114EU	TRANSISTOR(SI)	S
Q12	PFVTSI4431DY	TRANSISTOR(SI)	S
Q13	PQVTDTC114EU	TRANSISTOR(SI)	S
Q14	PQVTDTC114EU	TRANSISTOR(SI)	S
Q15	2SB1218A	TRANSISTOR(SI)	
Q16	PQVTDTC114EU	TRANSISTOR(SI)	S
		(DIODES)	
D1	PQVDRLS73T	DIODE(SI)	
D3	PFVDRMRLS245	DIODE(SI)	S
D4	PQVD1N7200R	DIODE(SI)	
DA1	MA141WK	DIODE(SI)	
		(CONNECTORS)	
CN1	PQJP7G30Y	CONNECTOR,7PIN	S
CN2	PQJP18A19Z	CONNECTOR,18PIN	S
CN3	PQJP5G30Y	CONNECTOR,5PIN	S
CN4	PFJP12A12Z	CONNECTOR,12PIN	S
CN5	PQJP2G30Y	CONNECTOR,2PIN	S
CN6	PQJP02G100Z	CONNECTOR,2PIN	
CN7	PQJS12A13Z	CONNECTOR,13PIN	
CN8	PFJS10A13Z	CONNECTOR,10PIN	S
		(COILS)	
L3	PQLQR2KA20T	COIL	S
L4	PQLQR2KA20T	COIL	S
L7	PQLQR2KA20T	COIL	S
L8	PQLQR2KA20T	COIL	S
L10	PQLQR2KA113	COIL	S
L11	PQLQR2KA113	COIL	S
L13	PQLQR2KA20T	COIL	S
L18	PQLQR2KA20T	COIL	S
L21	PQLQR2KA20T	COIL	S

Ref. No.	Part No.	Part Name & Description	Remarks
L22	PQLQR2KA20T	COIL	S
L23	PQLQR2KA20T	COIL	S
L24	PQLQR2KA20T	COIL	S
L25	PQLQR2KA20T	COIL	S
		(BATTERY)	
BAT1	PFSU1004Z	BATTERY	S
		(COMPONENTS PARTS)	
RA1	EXRV8V271JV	COMPONENTS PARTS	
RA2	EXRV8V271JV	COMPONENTS PARTS	
RA3	EXRV8V271JV	COMPONENTS PARTS	
RA4	EXRV8V271JV	COMPONENTS PARTS	
RA5	EXRV8V271JV	COMPONENTS PARTS	
RA6	EXRV8V271JV	COMPONENTS PARTS	
RA7	EXRV8V101JV	COMPONENTS PARTS	S
RA8	EXRV8V101JV	COMPONENTS PARTS	S
		(CRYSTAL OSCILLATORS)	
X1	PFVCCFS32Z	CRYSTAL OSCILLATOR	S
X2	PFVBKB240ZAT	CRYSTAL OSCILLATOR	S
X3	PFVC32256ZAT	CRYSTAL OSCILLATOR	S
		(FUSE)	
F2	PFRB001251KC	FUSE	S
F5	PFRB0031125T	FUSE RESISTOR	S
		(CERAMIC FILTERS)	
L2	PFVF1A121ST	CERAMIC FILTERS	
L5	PFVF1A121ST	CERAMIC FILTERS	
		(RESISTORS)	
F3	ERJ3GEY0R00	0	
F4	ERJ3GEY0R00	0	
J2	PQ4R18XJ000	0	S
J3	ERJ3GEY0R00	0	
J6	ERJ3GEY0R00	0	
J9	ERJ3GEY0R00	0	
J11	ERJ3GEY0R00	0	
L6	PQ4R18XJ100	10	S
L4	ERJ3GEY0R00	0	
L6	PQ4R18XJ100	0	S
L9	PQ4R18XJ220	22	S
L12	ERJ3GEY0R00	0	
L14	ERJ3GEYJ101	0	
L15	ERJ3GEY0R00	0	
L16	ERJ3GEYJ101	0	
L17	ERJ3GEYJ101	0	
L19	ERJ3GEYJ101	0	
L20	ERJ3GEY0R00	0	
L26	ERJ3GEY0R00	0	
L27	ERJ3GEY0R00	0	
L29	ERJ3GEY0R00	0	
L30	ERJ3GEY0R00	0	
L31	ERJ3GEY0R00	0	
L32	ERJ3GEY0R00	0	
L33	ERJ3GEY0R00	0	
R1	ERJ3GEYJ103	0.01	
R2	ERJ3GEYJ203	20K	
R3	ERJ3GEYJ472	4.7K	

Ref. No.	Part No.	Part Name & Description	Remarks
R4	ERJ3GEY0R00	0	
R5	ERJ3GEYJ271	270	
R6	ERJ3GEY0R00	0	
R7	ERJ3GEYJ271	270	
R8	ERJ3GEYJ271	270	
R10	ERJ3GEY0R00	0	
R11	ERJ3GEYJ271	270	
R12	ERJ3GEYJ271	270	
R13	ERJ3GEYJ271	270	
R14	ERJ3GEYJ472	470	
R15	ERJ3GEYJ103	10k	
R16	ERJ3GEYJ102	100	
R17	ERJ3GEYJ472	470	
R18	ERJ3GEYJ101	100	
R19	ERJ3GEYJ271	270	
R20	ERJ3GEYJ101	100	
R21	ERJ3GEYJ153	15K	
R22	ERJ3GEYJ470	47	
R24	ERJ3GEYJ222	220	
R25	ERJ3GEYJ101	100	
R26	ERJ3GEYJ101	100	
R27	ERJ3GEYJ101	100	
R28	ERJ3GEYJ562	5.6K	
R29	ERJ3GEYJ101	100	
R30	ERJ3GEYJ101	100	
R31	ERJ3EKF1101	0	
R34	ERJ3GEYJ104	100K	
R36	ERJ3GEYJ103	10K	
R37	ERJ3GEYJ103	10K	
R38	ERJ3GEYJ103	10K	
R41	ERJ3GEYJ222	2.2K	
R42	ERJ3GEYJ473	47K	
R43	ERJ3GEYJ124	120K	
R44	ERJ3GEYJ334	330K	
R45	ERJ3GEY0R00	0	
R46	ERJ3GEYJ102	1K	
R47	ERJ3GEYJ363	36K	
R49	ERJ3GEYJ222	2.2K	
R50	ERJ3GEYJ334	330K	
R51	ERJ3GEYJ393	39K	
R52	ERJ3GEYJ472	4.7K	
R54	ERJ3GEYJ272	2.7K	
R55	ERJ3GEYJ183	18K	
R56	ERJ3GEYJ393	39K	
R57	ERJ3GEYJ104	100K	
R58	ERJ3GEYJ472	4.7K	
R59	ERJ3GEYJ472	4.7K	
R60	ERJ3GEYJ224	220K	
R61	ERJ3GEYJ102	1K	
R62	ERJ3GEYJ222	2.2K	
R63	ERJ3GEYJ682	6.8K	
R64	ERJ3GEYJ222	2.2K	
R65	ERJ3GEYJ472	4.7K	
R66	ERJ3GEYJ101	100	







Ref. No.	Part No.	Part Name & Description	Remarks
R67	ERJ3GEYJ222	2.2K	
R68	ERJ3GEYJ103	10K	
R69	ERJ3GEYJ102	1K	
R70	ERJ3GEYJ103	10K	
R71	ERJ3GEYJ102	1K	
R72	ERJ3GEYJ222	2.2K	
R73	ERJ3GEYJ393	39K	
R74	ERJ3GEY0R00	0	
R75	ERJ3GEYJ472	4.7K	
R76	ERJ3GEYJ563	56K	
R77	ERJ3GEYJ273	27K	
R78	ERJ3GEYJ683	68K	
R79	ERJ3GEYJ682	6.8K	
R80	ERJ3GEYJ103	10K	
R82	ERJ3GEYJ394	390K	
R84	ERJ3GEY0R00	0	
R85	ERJ8GEYJ8R2	8.2	
R86	ERJ3GEYJ222	2.2K	
R88	ERJ3GEYJ393	39K	
R91	ERJ3GEYJ103	10K	
R95	ERJ3GEYJ103	10K	
R96	ERJ3GEYJ622	6.2K	
R97	ERJ3GEYJ103	10K	
R98	ERJ3GEYJ224	220K	
R99	ERJ3GEYJ224	220K	
R101	ERJ3GEYJ331	330	
R102	ERJ3GEYJ2R2	2.2	
R103	ERJ3GEYJ470	47	
R104	ERJ3GEYJ563	0.05	
R105	ERJ3GEYJ222	220	
R107	ERJ3GEYJ104	100K	
R108	ERJ3GEY0R00	0	
R110	ERJ3GEYJ222	2.2K	
R111	ERJ3GEYJ472	4.7K	
R113	ERJ3GEYJ105	1M	
R114	ERJ3GEYJ472	4.7K	
R115	ERJ3GEYJ472	4.7K	
R116	ERJ3GEYJ102	1K	
R117	ERJ3GEYJ102	1K	
R118	ERJ3GEYJ101	100	
R119	ERJ3GEYJ101	100	
R120	ERJ3GEYJ101	100	
R121	ERJ3GEYJ101	100	
R122	ERJ3GEYJ101	100	
R123	ERJ3GEYJ101	100	
R124	ERJ3GEYJ823	82K	
R125	ERJ3GEYJ223	22K	
R126	ERJ3GEYJ562	5.6K	
R127	ERJ3GEYJ472	4.7K	
R128	ERJ3GEYJ821	820	
R129	ERDS1VJ152	1.5K	S
R131	ERJ3GEYJ103	10K	
R132	ERJ3GEY0R00	0	
R133	ERJ3GEYJ473	47K	

Ref. No.	Part No.	Part Name & Description	Remarks
R135	ERJ3GEY0R00	0	
R136	ERJ3GEYJ271	270	
R137	ERJ3GEY0R00	0	
R138	ERJ3GEY0R00	0	
R139	ERJ3GEY0R00	0	
R140	ERJ3GEY0R00	0	
R142	ERJ3GEY0R00	0	
R143	ERJ3GEY0R00	0	
R144	ERJ3GEY0R00	0	
		(CAPACITORS)	
C1	ECUV1E104ZFV	0.1	S
C2	ECUV1H222KBV	0.0022	
C3	ECUV1H102KBV	0.001	S
C4	ECUV1H102KBV	0.001	
C5	ECUV1H102KBV	0.001	
C6	ECUV1E104ZFV	0.1	S
C7	ECUV1E104ZFV	0.1	S
C8	ECUV1E104ZFV	0.1	S
C9	ECUV1E104ZFV	0.1	S
C10	ECUV1E104ZFV	0.1	S
C11	ECUV1E104ZFV	0.1	S
C12	ECUV1C104KBV	0.1	
C13	ECUV1H102KBV	0.001	S
C14	ECUV1C104KBV	0.1	
C15	ECUV1E104ZFV	0.1	S
C16	ECUV1E104ZFV	0.1	S
C17	ECUV1H120JCV	12	
C18	ECUV1H180JCV	18	
C19	ECUV1E104ZFV	0.1	S
C20	ECUV1E104ZFV	0.1	
C21	ECUV1E104ZFV	0.1	
C22	ECUV1E104ZFV	0.1	
C24	ECEA1CK101	100	S
C25	ECUV1H102KBV	0.001	
C26	ECUV1E104ZFV	0.1	
C27	ECUV1H102KBV	0.001	
C28	ECUV1E104ZFV	0.1	
C29	ECUV1H100DCV	10	
C30	ECUV1H100DCV	10	
C31	ECUV1E104ZFV	0.1	S
C32	ECUV1H102KBV	0.001	
C33	ECUV1H100DCV	10	S
C35	ECUV1E104ZFV	0.1	S
C36	ECUV1E104ZFV	0.1	S
C37	ECUV1E104ZFV	0.1	S
C38	ECUV1H102KBV	0.001	S
C39	ECUV1E104ZFV	0.1	
C40	ECEA0JKA221	220	
C41	ECUV1E104ZFV	0.1	
C42	PQCUV1H104ZF	0.1	S
C43	ECUV1C104KBV	0.1	
C44	ECUV1H102KBV	0.001	
C46	ECUV1C104KBV	0.1	
C47	ECUV1C104KBV	0.1	

Ref. No.	Part No.	Part Name & Description	Remarks
C48	ECUV1H101JCV	100	
C49	ECUV1E104ZFV	0.1	
C50	ECUV1H681JCV	680	S
C51	ECEA1CKS100	10	S
C52	ECEA1CKS100	10	S
C53	ECUV1H330JCV	33	
C55	ECUV1E104ZFV	0.1	
C56	ECUV1E104ZFV	0.1	
C57	ECUV1E104ZFV	0.1	
C58	ECUV1C104KBV	0.1	
C59	ECUV1C104KBV	0.1	
C60	ECUV1H103KBV	0.01	
C61	ECUV1C104KBV	0.1	
C62	ECUV1H331JCV	330	S
C63	ECUV1C104KBV	0.1	
C64	ECUV1H102KBV	0.001	
C65	ECUV1C104KBV	0.1	
C66	ECUV1C104KBV	0.1	
C67	ECUV1H472KBV	0.0047	
C68	ECUV1H472KBV	0.0047	
C69	ECUV1E104ZFV	0.1	
C70	ECUV1C104KBV	0.1	
C71	ECUV1H333KBV	0.033	S
C72	ECUV1C104KBV	0.1	
C73	ECUV1H100DCV	10	
C74	ECUV1H100DCV	10	
C76	ECUV1H102KBV	0.001	
C77	ECUV1C104KBV	0.1	
C78	ECUV1E104ZFV	0.1	
C79	ECEA1CKS100	10	S
C80	ECUV1C104KBV	0.1	
C81	ECUV1C104KBV	0.1	
C82	ECUV1C104KBV	0.1	
C83	ECUV1E104ZFV	0.1	
C85	ECUV1E104ZFV	0.1	
C87	ECUV1C104KBV	0.1	
C88	ECUV1C104KBV	0.1	
C89	ECUV1H271JCV	270	S
C90	ECEA1CKS100	10	S
C91	ECUV1E104ZFV	0.1	
C92	ECUV1H102KBV	0.001	
C93	ECEA1CKS100	10	S
C94	ECUV1H103KBV	0.01	
C96	ECEA1CKS100	10	S
C97	ECUV1H102KBV	0.001	
C98	ECUV1E104ZFV	0.1	
C99	ECUV1C333KBV	0.03	
C100	ECUV1E104ZFV	0.1	
C101	ECUV1E104ZFV	0.1	
C102	ECUV1H101JCV	10	
C103	ECEA1CKS100	10	S
C104	ECEA1CKS100	10	S
C105	ECUV1E104ZFV	0.1	
C106	ECUV1E104ZFV	0.1	

Ref. No.	Part No.	Part Name & Description	Remarks
C107	ECEA0JKA221	220	
C112	ECUV1H391JCV	390	S
C116	ECUV1C104KBV	0.1	
C119	ECEA1CKS470	47	S
C121	PQCUV1H104ZF	0.1	S
C122	ECUV1E104ZFB	0.1	
C124	ECEA1CKS100	10	S
C125	ECUV1E104ZFB	0.1	
C126	ECEA1CK101	100	S
C127	ECUV1H102KBV	0.001	
C130	ECUV1H102KBV	0.001	
C131	ECUV1H102KBV	0.001	
C139	ECUV1H561JCV	560	S
C141	ECUV1C104KBV	0.1	
C143	ECUV1H102KBV	0.001	
C144	ECUV1H102KBV	0.001	
C145	ECUV1H102KBV	0.001	
C146	ECUV1H102KBV	0.001	
C148	ECUV1H223KBV	0.022	S
C149	ECUV1H102KBV	0.001	
C150	ECUV1H102KBV	0.001	
C152	ERJ3GEY0R00	0	
C153	ECUV1H271JCV	270	
C154	ECUV1H102KBV	0.001	
C156	ECUV1H102KBV	0.001	S
C157	ECUV1H102KBV	0.001	
C158	ECUV1H102KBV	0.001	
C159	ECUV1H102KBV	0.001	
C160	ECUV1H102KBV	0.001	
C161	ECUV1H102KBV	0.001	
		(JACK)	
CN2	PFJS32A11Z	JACK	S
CN4	PFJP12A12Z	JACK	S

10.4. ANALOG BOARD PARTS

Ref. No.	Part No.	Part Name & Description	Remarks
PCB2	PFLP1454BRZ	ANALOG BOARD ASS'Y (RTL)	
		(ICS)	
IC1	PQVIMC34119M	IC	S
IC2	PFVINJM2904M	IC	S
		(TRANSISTORS)	
Q2	2SC4155R	TRANSISTOR(SI)	
Q3	PQVTDTC143E	TRANSISTOR(SI)	
		(DIODES)	
D6	1SS131	DIODE(SI)	
D8	1SS131	DIODE(SI)	
D9	1SS131	DIODE(SI)	
D11	PQVDMZJ5R6A	DIODE(SI)	
D12	PQVDMZJ5R6A	DIODE(SI)	
		(JACKS AND CONNECTOR)	
CN2	PQJP02G100Z	CONNECTOR, 2PIN	
CN3	PQJJ1TB18Z	JACK	S
CN4	PFJJ1T01Z	JACK	S
		(SWITCHES)	
SW1	PFSH1A03Z	SWITCH	
SW2	ESE14A211	SWITCH	
SW3	PFSH1A03Z	SWITCH	
		(COILS)	
L1	PQLQR2BT	COIL	S
L2	PQLQR2BT	COIL	S
L5	PQLQR1RM601	COIL	S
L6	PQLQR1RS102	COIL	
L7	PQLQR1RS102	COIL	
L8	PQLQR1RM601	COIL	S
		(PHOTO ELECTRIC TRANSDUCERS)	
PC1	PQVIPC814K	PHOTO ELECTRIC TRANSDUCER	
PC2	PFVITLP320	PHOTO ELECTRIC TRANSDUCER	
		(RELAY)	
RLY1	PFSL003Z	RELAY	
		(VARISTORS)	
SA1	PFRZRA311P6T	VARISTOR	
SA2	PFVDRA102M	VARISTOR	S
		(TRANSFORMER)	
T2	PFLT8E009	TRANSFORMER	
POS1	PFRT002	TRANSFORMER	
		(RESISTORS)	
JJ201	ERJ3GEY0R00	0	
R1	ERJ3GEYJ101	100	
R2	ERJ3GEYJ472	4.7k	
R3	ERJ3GEYJ101	100	
R4	ERJ3GEYJ472	4.7k	
R5	ERJ3GEYJ101	100	
R6	ERJ3GEYJ472	4.7k	
R12	ERG2SJ121	120	
R14	ERDS2TJ221	220	
R16	ERDS1TJ473	47k	
R17	ERDS1TJ103	10k	
R18	ERJ3GEYJ273	27k	

Ref. No.	Part No.	Part Name & Description	Remarks
R19	ERJ3GEYJ222	2.2k	
R31	ERDS2TJ181	180	
R33	ERJ3GEYJ563	56k	
R34	ERJ3GEYJ563	56k	
R35	ERJ3GEYJ134	130k	
R36	ERJ3GEYJ134	130k	
R37	ERJ3GEYJ222	2.2k	
R38	ERJ3GEYJ222	2.2k	
R39	ERJ3GEYJ104	100k	
R41	ERJ3GEYJ152	1.5k	
R42	ERJ3GEYJ333	33k	
R45	ERJ3GEYJ331	330	
R46	ERJ3GEYJ152	1.5k	
R47	ERJ3GEYJ152	1.5k	
R48	ERJ3GEYJ123	12k	
R49	ERJ3GEYJ123	12k	
R50	ERJ3GEYJ394	390k	
R51	ERJ3GEYJ224	220k	
R52	ERJ3GEYJ222	2.2k	
R53	ERJ3GEY0R00	0	
R62	ERJ3GEYJ473	47k	
R63	ERJ3GEYJ331	330	
R64	ERJ3GEYJ223	22k	
R67	ERJ3GEY0R00	0	
R72	ERJ3GEYJ154	150k	
R73	ERJ3GEYJ114	110k	
R74	ERJ3GEYJ103	10k	
R75	ERJ3GEYJ153	15k	
R80	ERJ3GEYJ103	10k	
R81	ERJ3GEYJ622	6.2k	
		(CAPACITORS)	
C1	ECUV1H103KBV	0.01	
C2	ECUV1H103KBV	0.01	
C3	ECUV1H103KBV	0.01	
C8	ECUV1H103KBV	0.01	
C11	ECQE2E105KZ	1	S
C20	ECUV1H103KBV	0.01	
C23	ECUV1C104KBV	0.1	
C24	ECUV1C104KBV	0.1	
C25	ECUV1H151JCV	150P	
C26	ECUV1H104ZV	0.1	S
C30	ECEA1HKS4R7	4.7	S
C31	ECUV1C683KBV	0.068	
C33	ECUV1H682KBV	0.0068	S
C43	ECUV1H102KBV	0.001	
C44	ECEA1HKS4R7	4.7	S
C46	ECUV1H103KBV	0.01	
C47	ECEA1CKS100	10	S
C48	ECEA1CKS470	47	S
C49	ECUV1H472KBV	0.0047	
C51	ECUV1H103KBV	0.01	
C52	ECUV1H103KBV	0.01	
C53	ECUV1H333KDV	0.033	S
C54	ECUV1H333KDV	0.033	S















Ref. No.	Part No.	Part Name & Description	Remarks
C55	ECUV1H271JCV	270P	
C50	ERJ3GEY0R00	0	
C57	ERJ3GEY0R00	0	
C58	ECEA1CKS470	47	S
C61	ECEA1CKS470	47	S
		(THERMISTOR)	
POS1	PFRT002	THERMISTOR	




10.5. OPERATION BOARD PARTS

Ref. No.	Part No.	Part Name & Description	Remarks
PCB3	PFWP2FT77LA	OPERATION BOARD ASS'Y(RTL)	
		(ICS)	
IC1	MN7D032Z9J	IC	
		(TRANSISTORS)	
Q1	2SD1819A	TRANSISTOR(SI)	S
		(DIODE)	
LED1	LNJ801LPDJA	DIODE(SI)	
		(LIQUID CRYSTAL DISPLAY)	
CN2	PFAVM220B	LIQUID CRYSTAL DISPLAY	
		(PHOTO ELECTRIC TRANSDUCERS)	
PS1	CNA1006N	PHOTO ELECTRIC TRANSDUCER	
		(SWITCHES)	
SW1	EVQ11Y05B	SWITCH	
SW2	EVQ11Y05B	SWITCH	
SW3	EVQ11Y05B	SWITCH	
SW4	EVQ11Y05B	SWITCH	
SW5	EVQ11Y05B	SWITCH	
SW6	EVQ11Y05B	SWITCH	
SW7	EVQ11Y05B	SWITCH	
SW8	EVQ11Y05B	SWITCH	
SW9	EVQ11Y05B	SWITCH	
SW10	EVQ11Y05B	SWITCH	
SW11	EVQ11Y05B	SWITCH	
SW12	EVQ11Y05B	SWITCH	
SW13	EVQ11Y05B	SWITCH	
SW14	EVQ11Y05B	SWITCH	
SW15	EVQ11Y05B	SWITCH	
SW16	EVQ11Y05B	SWITCH	
SW18	EVQ11Y05B	SWITCH	
SW19	EVQ11Y05B	SWITCH	
SW20	EVQ11Y05B	SWITCH	
SW21	EVQ11Y05B	SWITCH	
SW22	EVQ11Y05B	SWITCH	
SW23	EVQ11Y05B	SWITCH	
SW24	EVQ11Y05B	SWITCH	
SW25	EVQ11Y05B	SWITCH	
SW26	EVQ11Y05B	SWITCH	
SW27	EVQ11Y05B	SWITCH	
SW28	EVQ11Y05B	SWITCH	
SW29	EVQ11Y05B	SWITCH	
SW30	EVQ11Y05B	SWITCH	
SW31	EVQ11Y05B	SWITCH	

Ref. No.	Part No.	Part Name & Description	Remarks
SW41	EVEGB141112B	SWITCH	
SW42	PFSH1A003Z	SWITCH	
		(RESISTORS)	
J26	PQ4R18XJ103	10K	S
J23	ERJ8GEY0R00	0	
J24	ERJ8GEY0R00	0	
J25	ERJ8GEY0R00	0	
R1	ERJ3GEY0R00	0	
R2	ERJ3GEY0R00	0	
R3	ERJ3GEYJ332	3.3K	
R4	ERJ3GEYJ564	560K	
R5	ERJ3GEYJ223	22K	
R6	ERJ3GEYJ682	6.8K	
R7	ERJ3GEYJ331	330	
R8	ERJ3GEYJ331	330	
R9	ERJ3GEYJ101	100	
R10	ERJ3GEYJ472	4.7K	
R11	ERJ3GEYJ331	330	
R12	ERJ3GEYJ563	56K	
R13	ERJ3GEYJ273	27K	
R14	ERJ3GEYJ561	560	
R17	ERJ3GEYJ271	270	
R24	ERJ3GEY0R00	0	
R25	ERJ3GEYJ4R7	4.7	
R43	PQ4R10XJ103	10K	S
R44	ERJ3GEY0R00	0	
R45	ERJ3GEY0R00	0	
R46	ERJ3GEY0R00	0	
R47	ERJ3GEY0R00	0	
R48	ERJ3GEY0R00	0	
		(CAPACITORS)	
C3	ECUV1E104ZFV	0.1	
C5	ECEA0JKA221	220	
C7	ECUV1H331JCV	330P	S
C8	ECUV1H121JCV	120P	
C9	ECUV1H331JCV	330P	S
C10	ECUV1H681JCV	680P	S
C11	ECUV1C104KBV	0.1	
C12	ECUV1H103KBV	0.01	
C13	ECEA1CKS470	47	S
C14	ECUV1H103KBV	0.01	
C15	ECUV1E104ZFV	0.1	
C16	ECUV1E104ZFV	0.1	
C18	ECUV1C224ZFV	0.22	S
C19	ECUV1E104ZFV	0.1	
		(COILS)	
L1	PQLQR1ET	COIL	S

10.6. POWER SUPPLY BOARD PARTS

Ref. No.	Part No.	Part Name & Description	Remarks
PCB4	PFLP1282MZL	POWER SUPPLY BOARD ASS'Y (RTL)	
		(ICS)	
IC101	PFVIFA5317P	IC	
IC201	AN1431T	IC	
IC202	PFVITA7805F	IC	S
		(TRANSISTORS)	
Q101	2SK2640	TRANSISTOR(SI)	
		(DIODES)	
D101	PFVD1N4005	DIODE(SI)	 S
D102	PFVD1N4005	DIODE(SI)	 S
D103	PFVD1N4005	DIODE(SI)	 S
D104	PFVD1N4005	DIODE(SI)	 S
D105	PFVDAG01A	DIODE(SI)	
D106	MA165	DIODE(SI)	
D107	MA4220	DIODE(SI)	
D108	PQVDERA1802	DIODE(SI)	S
D201	PFVDSF5LC20U	DIODE(SI)	S
D202	PFVDD1NL20U	DIODE(SI)	S
		(COIL)	
L101	ELF15N007A	COIL	
		(CONNECTORS)	
CN31	PQJP2D98Z	CONNECTOR, 2PIN	
CN301	PQJP7G30Z	CONNECTOR, 7PIN	
		(FUSE)	
F101	PQBA1C50NBKL	FUSE	S 
		(PHOTO COUPLER)	
PC101	0N3131SKU	PHOTO ELECTRIC TRANSDUCER	S 
		(TRANSFORMER)	
T101	PFLTSRW2820E	TRANSFORMER	S 
		(VARIABLE RESISTOR)	
VR201	EVNDJAA03B53	SEMI-FIXED VARIABLE RESISTOR	
		(VARISTOR)	
ZNR101	ERZV10DK471U	VARISTOR	
		(RESISTORS)	
R101	ERDS2TJ105	1M	
R102	ERDS2TJ334	330k	
R103	ERDS2TJ334	330k	
R104	ERG1SJ104	100k	
R105	ERX2SJR22	0.22	
R106	ERG2SJ470	47	
R108	ERDS2FJ150	15	
R109	ERDS2TJ220	22	
R121	PQ4R10XJ103	10k	S
R122	ERJ6GEYJ621	620	
R124	PQ4R10XJ181	180	S
R125	PQ4R10XJ103	10k	S
R126	PQ4R10XJ562	5.6k	S
R127	PQ4R10XJ182	1.8k	S
R128	PQ4R10XJ181	180	

Ref. No.	Part No.	Part Name & Description	Remarks
R136	PQ4R10XJ393	39k	S
R137	PQ4R10XJ393	39k	S
R202	ERG2SJ152	1.5k	
R221	PQ4R10XJ222	2.2k	S
R222	PQ4R10XJ222	2.2k	S
R223	PQ4R10XJ101	100	S
R224	PQ4R10XJ273	27k	S
R225	PQ4R10XJ332	3.3k	S
		(CAPACITORS)	
C101	ECQU2A104MV	0.1	
C102	ECQU2A473MG	0.047	
C103	PFKDE2GA102K	0.001	S
C105	PFKDE2GA222M	0.0022	
C106	PFEU200SX180	180	S
C108	ECKD3A102KBP	0.001	
C109	ECA1VHG470	47	
C119	ECKD3A221KBP	220P	
C121	ECUV1H472KBN	0.0047	
C122	ECUV1C224KBX	0.22	
C123	ECUV1H561KBM	560P	
C124	ECUV1H104KBW	0.1	S
C201	PFCEA35F471	470	S
C202	ECKD3A102KBP	0.001	
C203	PFCEA16A470	470	S
C204	PFCEA35A47M	47	S
C205	PFCEA50A1M	1	S

10.7. FIXTURES AND TOOLS

Ref. No.	Part No.	Part Name & Description	Remarks
EC1	PQZZ7K5Z	CONNECTOR, 7P	
EC2	PFZZ18K2Z	CONNECTOR, 18P	
EC3	PQZZ2K1Z	CONNECTOR, 11P	
EC4	PFZZ5K13Z	CONNECTOR, 5P	
EC5	PFZZ12K4Z	CONNECTOR, 12P	
EC6	PFZZ10K4Z	CONNECTOR, 10P	
EC7	PQZZ2K12Z	CONNECTOR, 2P	
EC8	PQZZ12K4Z	CONNECTOR, 12P	
EC9	PQZZ2K13Z	CONNECTOR, 2P	
EC10	PFJE1015Z	LEAD WIRE	
EC11	PFJE1005Z	LEAD WIRE	
	KM79811245C0	BASIC FACSIMILE TECHNIQUE	
		(For training service / technicians)	

Notes:

Tools and Extension Cords are useful for servicing. / (They make servicing easy.)

11. PRINTED CIRCUIT BOARD

11.1. DIGITAL BOARD: COMPONENT VIEW

11.2. DIGITAL BOARD: BOTTOM VIEW

11.3. ANALOG BOARD: COMPONENT VIEW

11.4. ANALOG BOARD: BOTTOM VIEW

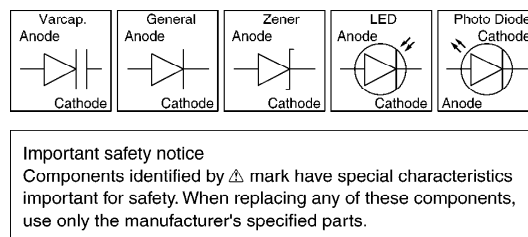
11.5. OPERATION BOARD

11.6. POWER SUPPLY BOARD

12. FOR THE SCHEMATIC DIAGRAMS

Note:

1. DC voltage measurements are taken with an oscilloscope or a tester with a ground.
2. The schematic diagrams and circuit board may be modified at any time with the development of new technology.



13. SCHEMATIC DIAGRAM

13.1. DIGITAL BOARD

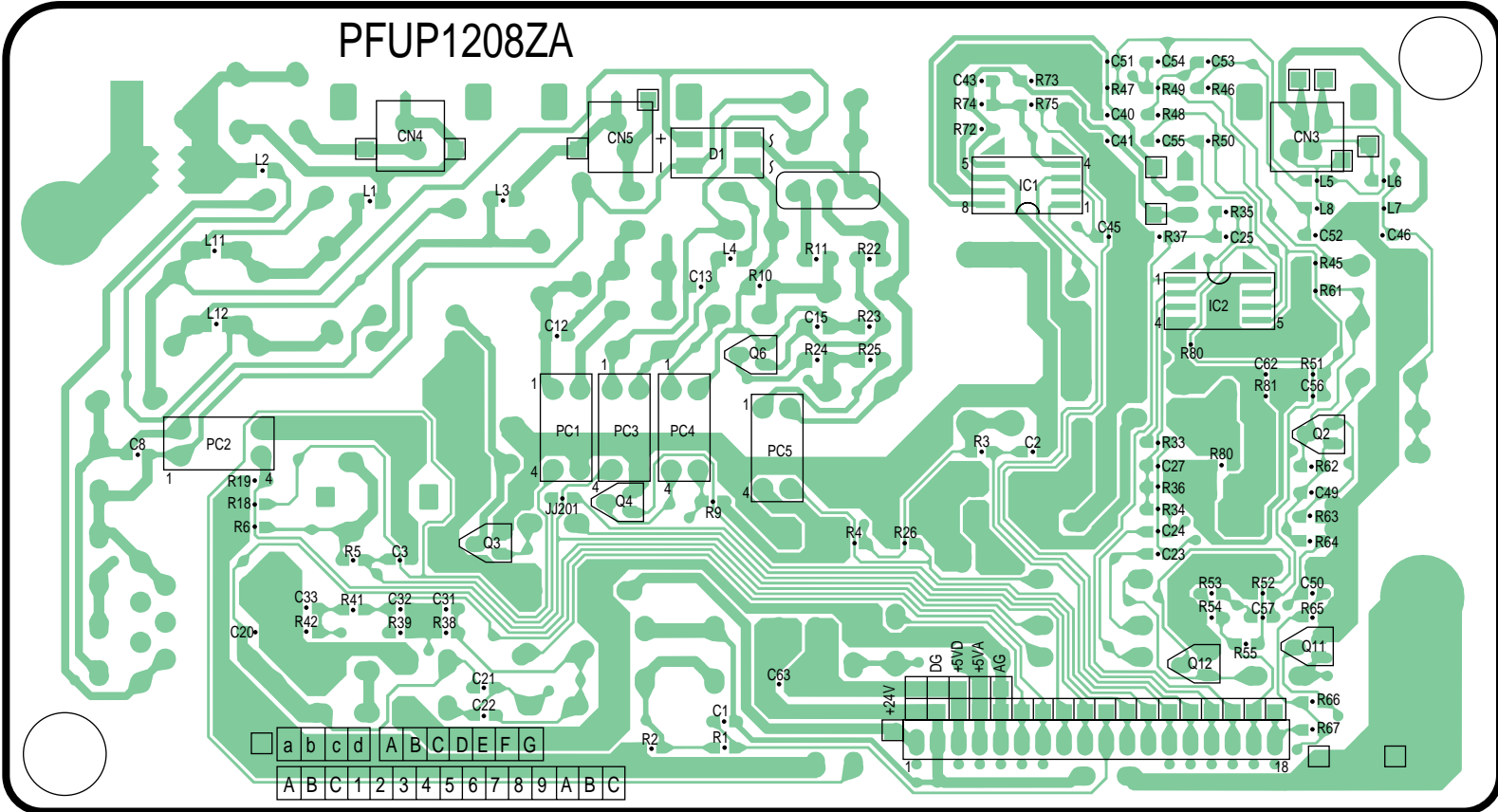
13.2. ANALOG BOARD

13.3. OPERATION BOARD

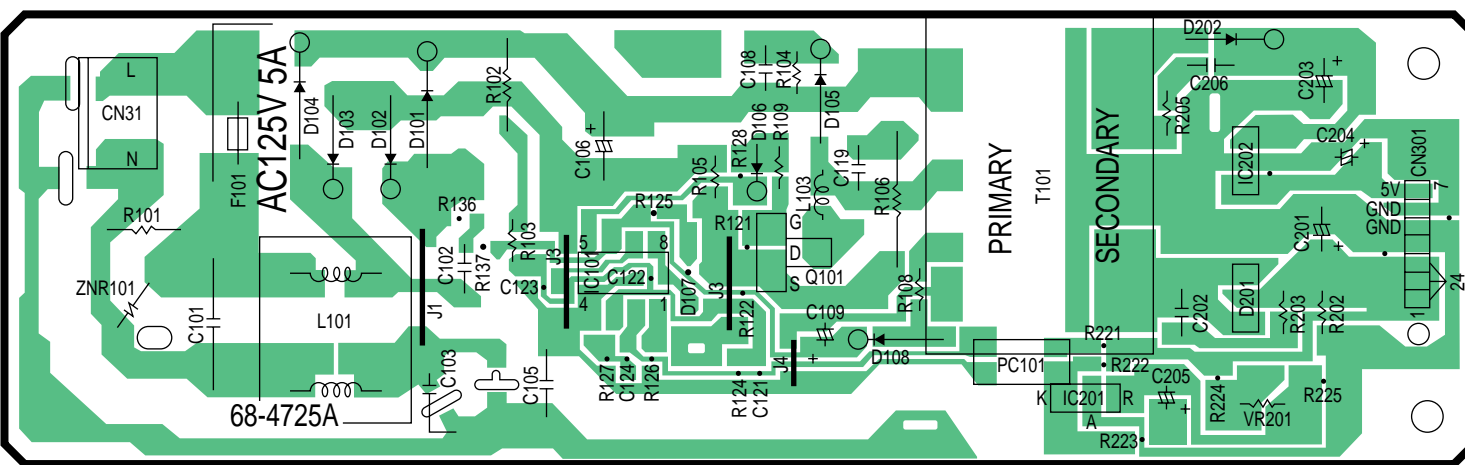
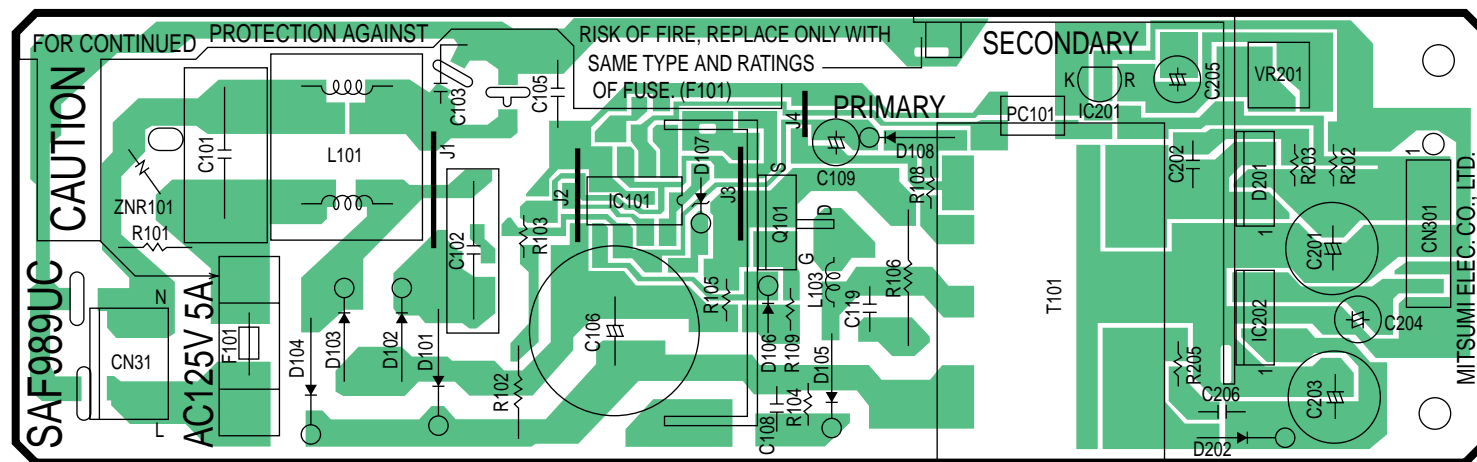
13.4. POWER SUPPLY BOARD

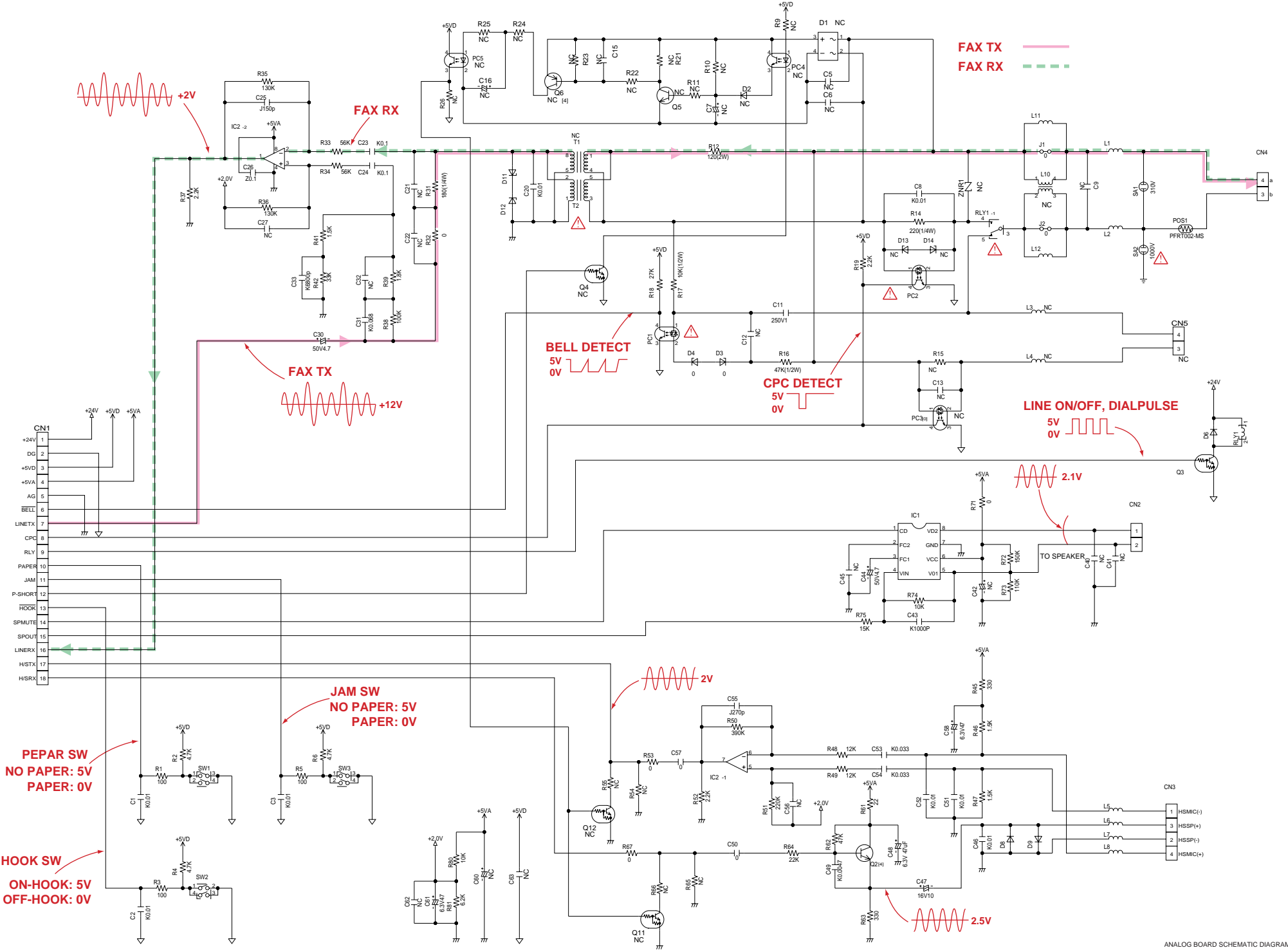
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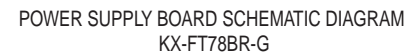
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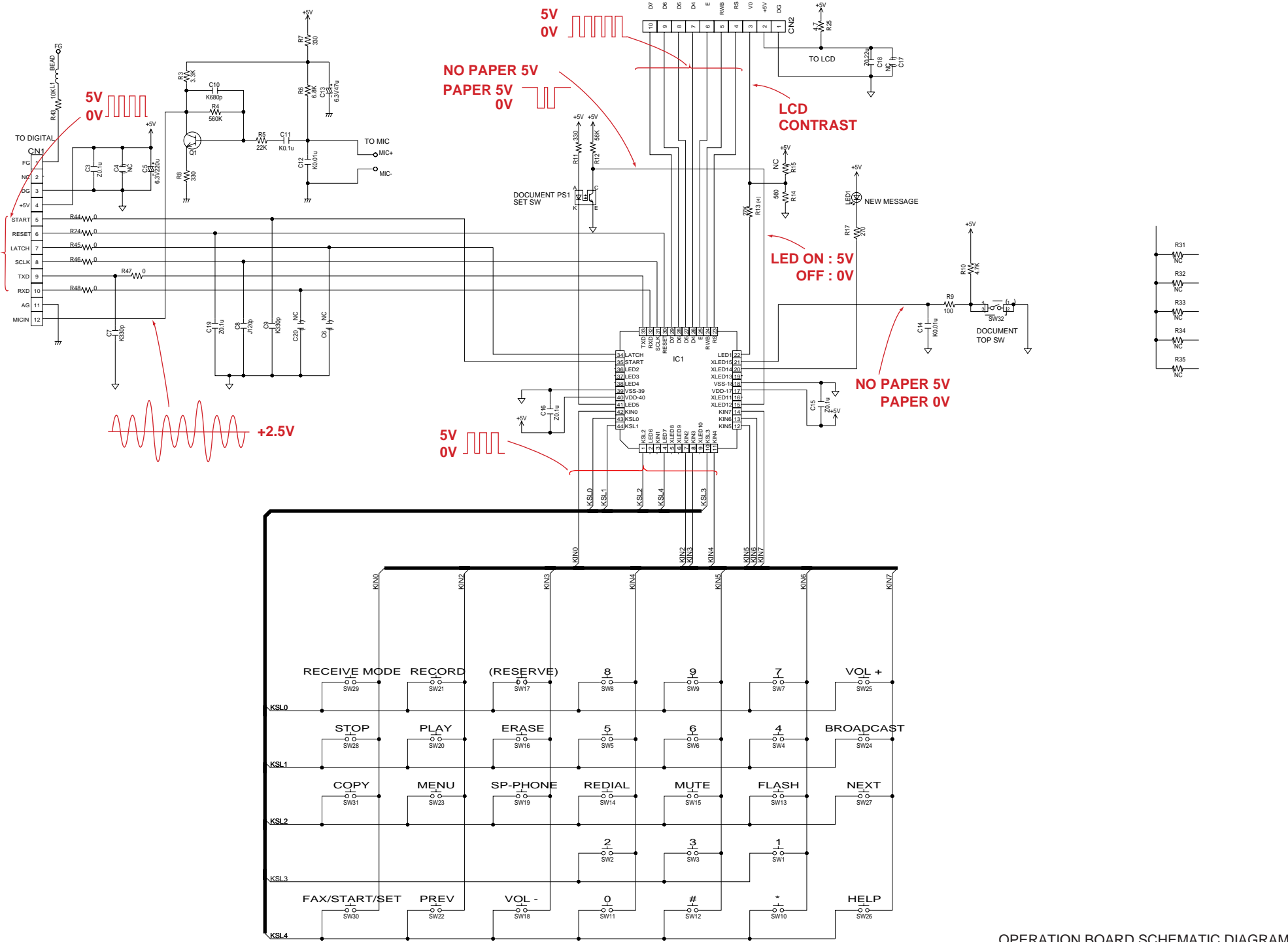


(BOTTOM VIEW)

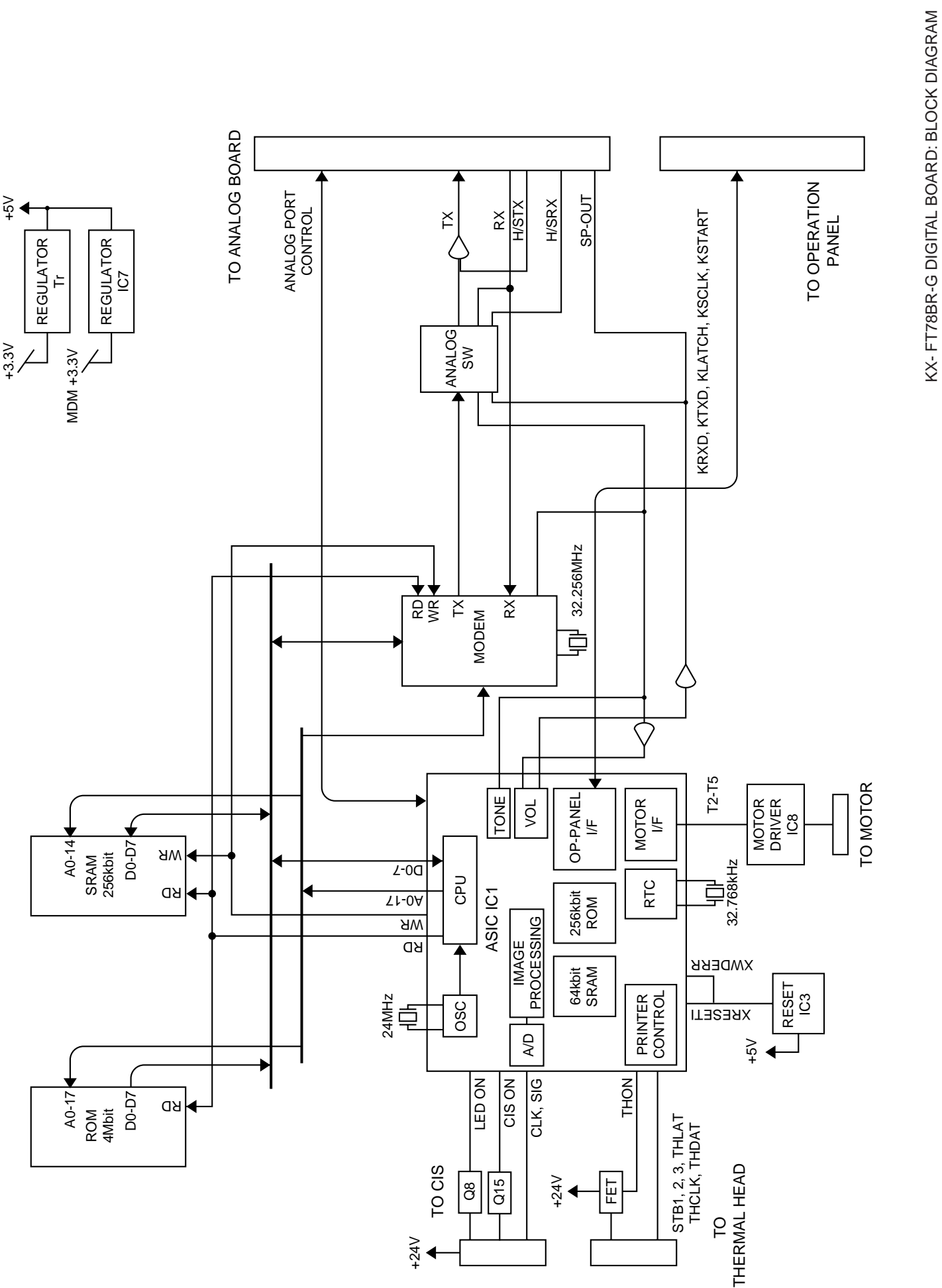


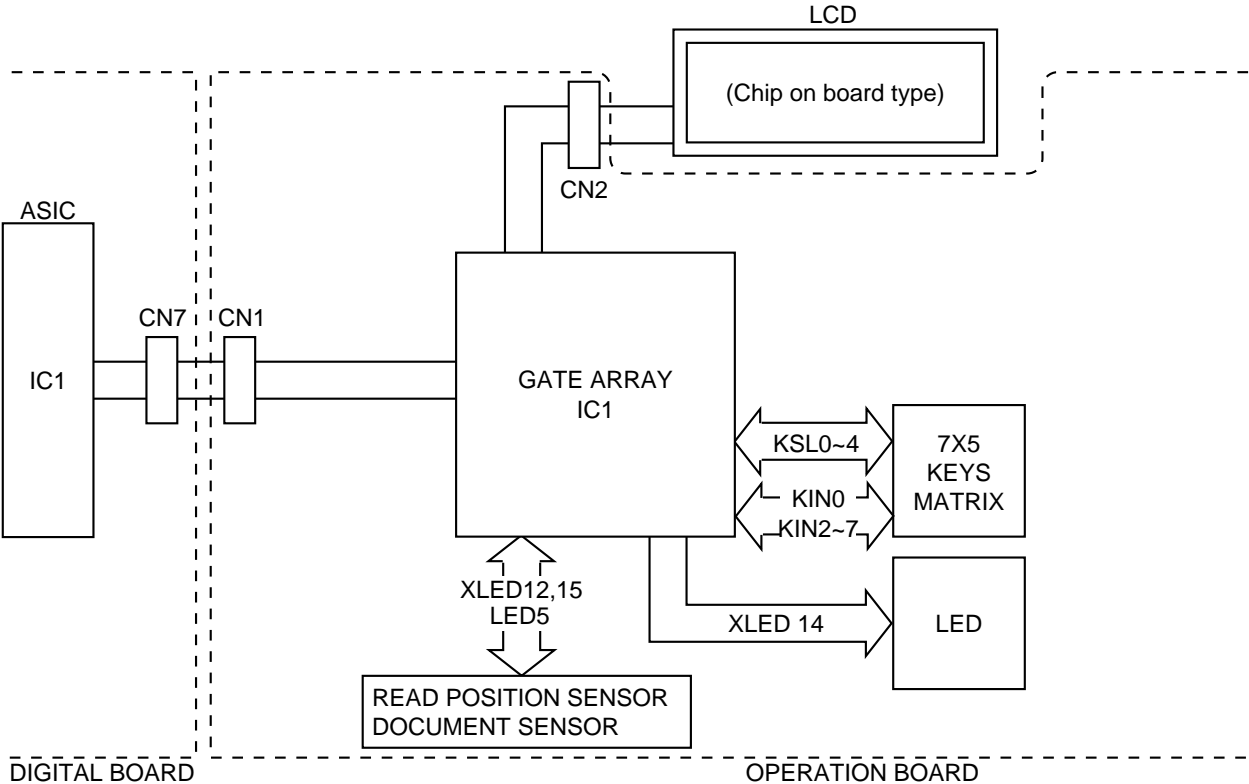






OPERATION BOARD SCHEMATIC DIAGRAM
KX-FT78BR-G





KX- FT78BR-G OPERATION BOARD: BLOCK DIAGRAM

